

THE NATIONAL OCEANIC AND ATMOSPHERIC
ADMINISTRATION'S FISCAL YEAR 2009
BUDGET PROPOSAL AND GAO'S REPORT ON
THE AVIATION WEATHER SERVICE

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY AND
ENVIRONMENT
COMMITTEE ON SCIENCE AND
TECHNOLOGY
HOUSE OF REPRESENTATIVES
ONE HUNDRED TENTH CONGRESS

SECOND SESSION

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CONTENTS

February 26, 2008

Witness List	Page 2
Hearing Charter	3

Opening Statements

Statement by Representative Nick Lampson, Chairman, Subcommittee on Energy and Environment, Committee on Science and Technology, U.S. House of Representatives	9
Written Statement	10
Statement by Representative Bob Inglis, Ranking Minority Member, Sub- committee on Energy and Environment, Committee on Science and Tech- nology, U.S. House of Representatives	11
Written Statement	12
Prepared Statement by Representative Jerry F. Costello, Member, Sub- committee on Energy and Environment, Committee on Science and Tech- nology, U.S. House of Representatives	12
Prepared Statement by Representative David Wu, Chairman, Subcommittee on Technology and Innovation, Committee on Science and Technology, U.S. House of Representatives	13

Panel I:

Vice Admiral Conrad C. Lautenbacher, Jr., Under Secretary of Commerce for Oceans and Atmosphere; NOAA Administrator, National Oceanic and Atmospheric Administration, U.S. Department of Commerce	
Oral Statement	14
Written Statement	15
Biography	21
Discussion	
GOES-R Budget Estimate	22
The VIIRS Instrument	23
Funds for the Hurricane Supplemental Buoys	24
The Tsunami Warning System	25
Coral Reef Watch Program	25
Tsunami Education and Mitigation Funding	25
Disaster Relief for Fisheries	28
Ocean Surface Winds Vector and QuikSCAT	29
Rule Changes for Red Snapper Fisheries	30
NPOESS Funding	30
Fixing Fiscal Year 2008 Budget Allocations	36

Panel II:

Mr. David A. Powner, Director, Information Technology Management Issues, U.S. Government Accountability Office (GAO)	
Oral Statement	37
Written Statement	38
Biography	49

IV

	Page
Dr. John L. Hayes, Assistant Administrator for Weather Services; Director, National Weather Service, National Oceanic and Atmospheric Administra- tion, U.S. Department of Commerce	
Oral Statement	49
Written Statement	51
Biography	54
Mr. Eugene D. Juba, Senior Vice President for Finance Services, Air Traffic Organization, Federal Aviation Administration	
Oral Statement	55
Written Statement	56
Biography	58
Discussion	
Relationship Between FAA and NWS	58
Evaluating the Performance of CWSUs	59
Responding to New FAA Requirements	59
Ensuring Consistency of Weather Products and Services	60
NWS Communication With the FAA	61
FAA Weather Contracting	61
More on CWSU Support	63
Evaluating NWS Proposals	63
NWS and FAA Working Cooperatively	64

Appendix: Answers to Post-Hearing Questions

Vice Admiral Conrad C. Lautenbacher, Jr., Under Secretary of Commerce for Oceans and Atmosphere; NOAA Administrator, National Oceanic and Atmospheric Administration, U.S. Department of Commerce	68
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**THE NATIONAL OCEANIC AND ATMOSPHERIC
ADMINISTRATION'S FISCAL YEAR 2009
BUDGET PROPOSAL AND GAO'S REPORT ON
THE AVIATION WEATHER SERVICE**

TUESDAY, FEBRUARY 26, 2008

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, DC.

The Subcommittee met, pursuant to call, at 1:15 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Nick Lampson [Chairman of the Subcommittee] presiding.

BART GORDON, TENNESSEE
CHAIRMAN

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The Subcommittee on Energy and Environment

Hearing on

**The National Oceanic and Atmospheric Administration's Fiscal Year 2009 Budget
Proposal and GAO's Report on the Aviation Weather Service**

Tuesday, February 26, 2008
1:00 p.m. – 3:00 p.m.
2318 Rayburn House Office Building

Witness List

Panel I

Vice Admiral Conrad C. Lautenbacher, Jr.
*Under Secretary for Oceans and Atmosphere and Administrator
National Oceanic and Atmospheric Administration*

Panel II

Mr. David Powner
*Director, Information Technology Management Issues
Government Accountability Office*

Dr. John L. "Jack" Hayes
*Assistant Administrator for Weather Services and
Director, National Weather Service
National Oceanic and Atmospheric Administration*

Mr. Eugene Juba
*Senior Vice President for Finance, Air Traffic Organization,
Federal Aviation Administration*

HEARING CHARTER

**SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES**

**The National Oceanic and Atmospheric
Administration's Fiscal Year 2009
Budget Proposal and GAO's Report on
the Aviation Weather Service**

TUESDAY, FEBRUARY 26, 2008
1:00 P.M.–3:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

Purpose

On Tuesday, February 26, 2008 at 1:00 p.m. the House Committee on Science and Technology's Subcommittee on Energy and Environment will hold a hearing to examine the National Oceanic and Atmospheric Administration (NOAA) Fiscal Year 2009 (FY09) budget proposal and the Government Accountability Office (GAO) report on Aviation Weather Services.

Witnesses*Panel I: NOAA FY09 Budget Proposal*

Vice Admiral Conrad Lautenbacher, Jr., Under Secretary of Commerce for Oceans and Atmosphere and Administrator, National Oceanic and Atmospheric Administration

Panel II: GAO's Report on Aviation Weather Service

Mr. John L. (Jack) Hayes, Assistant Administrator for National Weather Service, National Oceanic and Atmospheric Administration

Mr. Eugene D. Juba, Senior Vice President for Finance, Air Traffic Organization, Federal Aviation Administration

Mr. David Powner, Director, Information Technology Management Issues, Government Accountability Office

Background

The President's FY 2009 budget request for the National Oceanic and Atmospheric Administration (NOAA) is \$4.2 billion, 4.8 percent above the FY 2008 enacted funding.

NOAA's mission includes weather forecasting, climate prediction, management of fisheries and coastal and ocean resources. In addition, NOAA is responsible for mapping and charting our coastal areas and providing other navigation support services through programs of the National Ocean Service (NOS). NOAA conducts research in support of these missions including atmospheric sciences, coastal and oceanic science, climate and air quality research, ecosystem research, and fisheries and marine mammal research. NOAA also operates a constellation of satellites that monitor and transmit data for weather forecasting, climate prediction, space weather forecasting, and Earth and ocean science research through the National Environmental Satellite Data and Information Service (NESDIS). NESDIS also analyzes, processes, and distributes weather and climate data to government and non-government organizations and archives these data for future use.

The table below shows the six primary accounts of the agency's budget. The line offices receiving increases in the FY 2009 request are the National Weather Service (NWS), the National Environmental Satellite, Data, and Information Service (NESDIS), and Program Support. The Administration's budget proposal decreases funding for the Office of Oceanic and Atmospheric Research (OAR), the National Marine Fisheries Service (NMFS), and the National Ocean Service (NOS).

FIGURE 1: NOAA FY 2009 BUDGET REQUEST
(In millions of dollars)

NOAA Program	FY08 Enacted	President's FY09 Request	FY09 Request vs. FY08 Enacted	% Change
National Weather Service	911.4	930.7	+ 19.3	+ 2.1%
Oceanic & Atmospheric Research	398.0	382.6	- 15.4	- 3.9%
National Environmental Satellite, Data, and Information Service	955.1	1157.9	+ 202.8	+ 21.2%
Program Support	445.7	519.1	+ 73.4	+ 16.5%
National Ocean Service*	536.1	488.2	- 47.9	- 8.9%
National Marine Fisheries Service**	829.1	782.3	- 46.8	- 5.6%
TOTAL Direct Obligations***	4075.5	4260.8	+ 340.4	+ 4.5%

* NOS programs are shared jurisdiction with the Resources Committee or not within the jurisdiction of the Committee on Science and Technology

** NMFS is solely within the jurisdiction of the Resources Committee

*** This figure includes appropriated funds plus transfers from fisheries funds

National Weather Service:

The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, adjacent waters, and ocean areas for the protection of life and property. NWS provides a national infrastructure to gather and process data worldwide from the land, sea, and air.

The NWS request is a two percent net increase (\$19 million) over the FY 2008 enacted budget. The Administration is requesting \$13.5 million for the Operations, Research and Facilities (ORF) accounts and \$5.7 million for the Procurement, Acquisitions and Construction (PAC) accounts above the enacted FY 2008 budget. While the Administration is requesting an overall increase for NWS, there are a number of reductions for specific line items in both the ORF and PAC accounts. The major proposed increases and decreases in these accounts are discussed below.

The Administration has requested increases of \$33.9 million in the ORF accounts. The majority of the increase (\$22.9 million) is within the Local Warning and Forecasts and includes \$3 million for operations and maintenance of the 15 hurricane detection buoys that were acquired and deployed in FY 2005 and FY 2006; \$2.9 million to upgrade NOAA weather radio; \$6.6 to upgrade the Advanced Weather Information Processing System; and \$4.8 million to convert the data transmission frequency for additional stations in the wind profiler network. The Administration is also requesting an additional \$4.3 million to improve hurricane forecast modeling.

The Advanced Weather Interactive Processing System (AWIPS) is the specialized software package deployed in each of the local forecasting offices that enables forecasters to prepare accurate, timely forecasts and warnings. There has been a demand for increase lead time and more precision in weather, flood, and hurricane forecasts.

The Wind Profiler data improves accuracy and lead times for tornado, severe thunderstorm, flash flood, and winter storm warnings. The increase will also provide technology upgrades to the twenty-year-old equipment and assist NOAA in completing the transition of this network to a fully operational system.

The requested increases in the NWS ORF accounts are partially offset by decreases in funding. There are seventeen projects proposed for elimination (\$20.4 million in FY 2008 funding). These projects are designated by Congress for funding and are routinely eliminated by the Administration as "Congressional earmarks." A

number of these programs have been funded for many years and support on-going forecasting services (e.g., Susquehanna River Basin Flood System). One of the projects eliminated is the U.S. Weather Research Program's Hemispheric Observing System Research and Predictability Experiment (THORpex), a multi-year international field experiment to improve two to ten-day forecasts being done in cooperation with international partners and numerous U.S.-based research organizations (\$5.8 million).

The requested increase is not sufficient to cover all current forecast and warning activities provided by NOAA in addition to the requested upgrades and operational and maintenance requirements for current weather forecasting equipment. The Agency must also comply with the requirements of mandatory pay raises for federal employees. When additional funds are not provided to cover these costs, the funding must come at the expense of program funding or through deferred maintenance. This is especially important for the NWS whose forecast and warning operations require a high level of staffing through the network of offices throughout the country. The level of funding requested will not enable NWS to move new monitoring and forecasting equipment from research to fully operational mode.

National Environmental Satellite Data and Information Service (NESDIS):

The President's budget requests a net increase for the National Environmental Satellite Data and Information Service (NESDIS) budget of \$203 million (21 percent). The Administration's budget request for the NESDIS ORF account is \$13.9 million less than the FY 2008 enacted budget. The Administration requests an increase of \$216.7 over the FY08 enacted budget for the PAC account.

The ORF account for NESDIS contains the programmatic funding for management, processing, analyzing, and archiving the data received from all of NOAA's weather monitoring equipment—both ground-based and space-based. This program account includes funds for data processing and analyses at data centers located in Kentucky, North Carolina, Maryland, and West Virginia. The FY 2009 request reduces funding for the four data centers by approximately 81 percent below the FY 2008 enacted funding. This account also supports a number of regional climate centers and centers that provide data and information services. The Administration's budget proposes to reduce these accounts by \$23.8 million below the FY 2008 enacted budget.

The Administration requests some increases to the ORF accounts for Satellite Observing Systems (\$9.7 million). The requested increases would support the routine replacement and upgrading of ground based equipment and software and to maintain the continuity of data on sea ice used to forecast sea ice changes to support navigation. The largest single requested increase within this ORF account is \$3 million for ocean vector wind studies. This funding would provide information to support the development of a replacement for the data provided by the QuikSCAT satellite used in hurricane forecasting.

The budget for NESDIS is dominated by the PAC account that provides funds for the acquisition of NOAA's weather satellite systems. NOAA operates two satellite systems that collect data for weather forecasting. The Polar-Orbiting Environmental Satellites (POES) orbit the Earth and provide information for medium to long-range weather forecasts. The geostationary satellites (GOES) gather data above a fixed position on the Earth's surface and provide information for short-range warnings and current weather conditions. Both of these satellite systems are developing a new series and the first of the new satellites must be launched around 2014 to maintain the continuity of weather forecasting data. Increases and decreases in the PAC account reflect the different phases of the design, build and launch of the satellites.

There is a planned decrease of \$49 million below the FY 2008 enacted budget for the last of the current series of polar satellites, NOAA N-Prime, which is scheduled for launch in February 2009. There is also a planned decrease for the National Polar-Orbiting Operational Satellite System (NPOESS), reflecting the post-Nunn-McCurdy funding profile for the NPOESS program. The Administration is requesting \$288 million for NPOESS in FY 2009 (\$43.3 million less than FY 2008 funding). The funds are to contribute to the tri-agency NPOESS program and be used to continue the development of the NPOESS sensors for the NPP project (NPOESS Preparatory Project) and for the first NPOESS satellite scheduled for launch in 2013.

The budget request for the current series of Geostationary Operational Environmental Satellites (GOES-N, -O and -P) reflects a \$7 million decrease because GOES-O and GOES-P are in the final stages of development. GOES-N was launched last May. GOES-O is scheduled for launch later this year. The last satellite of this current series, GOES-P is in storage.

The FY 2009 request of \$477 million, a \$242 million increase for the new geostationary satellite series (GOES-R) to support the continued development and pro-

curement of this new series. The GOES-R satellite series was originally scheduled for launch in 2014. However, the reduction in funds included in the FY 2008 enacted budget has created a likely delay in the launch date to 2015. In 2006, the estimate for the new GOES series of satellites—GOES-R—was projected to be \$5 billion higher than the original estimate. NOAA has restructured the program to achieve cost reductions and has obtained independent cost estimates for the program. The Administration now estimates the cost of the new GOES series at \$7.62 billion over a twenty-year period (through 2028). The cost savings are achieved by reducing the number of satellites in the series (from four to two) as well as reducing the capabilities of the satellites.

In addition to the procurements of these two satellite systems, the Administration is requesting an increase of \$74 million to restore high priority climate sensors that were de-manifested from the NPOESS program in 2006 as a result of the Nunn-McCurdy mandated restructuring of the program. These funds would support initial work on two sensors, the Clouds and the Earth's Radiant Energy System (CERES) sensor and the Total Solar Irradiance Sensor (TSIS).

Oceanic and Atmospheric Research:

The Office of Oceanic and Atmospheric Research (OAR) is the primary research arm of NOAA that provides the scientific information and tools needed for better understanding of the oceans and atmosphere. OAR conducts the scientific research, environmental studies, and technology development needed to improve NOAA's operations. OAR consists of seven internal research laboratories and manages extramural research at 30 National Sea Grant colleges and universities. Therefore, OAR contains over half of the research programs at NOAA. The Administration proposes to reduce funding for OAR programs by nearly \$16 million below the FY08 enacted funding levels, approximately a four percent reduction.

The OAR ORF accounts would be reduced by \$15.7 million under the Administration's proposal with the majority of the reductions coming from programs in the Ocean, Coastal, and Great Lakes Research account (\$24.2 million). The proposed funding in FY 2009 for these programs is reduced from \$130 million to \$106 million, an 18 percent decrease for these programs. Sea Grant receives a cut of \$2 million. The Administration's request includes an \$8 million increase for Ocean Exploration and Research. However, the Administration proposed last year to merge the National Undersea Research Program (NURP) with the Ocean Exploration Program and this is again reflected in the budget. Therefore, the \$8 million increase is not an overall increase for Ocean Exploration Programs, but reflects the transfer of funds for NURP activities to this line of the budget. The FY 2008 enacted budget for these two programs included \$19.5 million for Ocean Exploration and \$14.7 million for NURP for a total of \$34.2 million. The FY 2009 proposed funding for these two programs is \$6.4 million below the FY 2008 enacted funding level. The Administration's proposal also eliminates \$6.9 million in funding from the Aquatic Invasive Species program and the Marine Aquaculture Program (\$3.6 million and \$3.2 million, respectively). Another \$6.6 million dollars is also proposed for elimination from ten of the Partnership programs in this account.

Weather and Air Quality research accounts receive a net increase in the FY 2009 request (\$5.5 million dollars) in comparison to the FY 2008 enacted levels. This includes the Laboratories and Joint Institutes that would receive an increase (\$3 million) above FY 2008 enacted levels and an increase for the U.S. Weather Research program of \$5.5 million. These increases are offset by a cut of \$3 million for seven Partnership Programs funded in the FY 2008 budget by Congress.

The Climate Research programs receive a proposed net increase of \$2.7 million. The Administration proposes increases of \$4.6 million increase for competitive research programs including the National Integrated Drought Information (NIDIS) and an increase of \$8.3 million for Climate Data and Information programs. These proposed increases are offset by reductions in the Climate Observations and Services programs (\$8.1 million) and the elimination of two Partnership programs—the Abrupt Climate Change Research Program and a Drought Research Study (\$1.1 million) and a decrease in the climate research conducted by Laboratory and Joint Institutions (\$1.9 million).

The OAR budget also contains funding for the High-Performance Computing and Communication (HPCC) program. NOAA relies upon sophisticated computer models to make major improvements in NOAA's ability to forecast the weather and climate and to model ecosystems and ocean processes. The FY 2009 budget request proposes \$13 million, about a \$369,000 increase for this program.

National Ocean Service:

The National Ocean Service (NOS) protects the National Marine Sanctuaries and is an advocate for coastal and ocean stewardship. It also introduced electronic nautical charts which they combine with Global Positioning Systems (GPS) to enhance the safety and efficiency of navigation of U.S. waterways. The President's FY 2009 request for NOS would reduce funding for NOS programs by nine percent or \$48 million as compared to the FY 2008 enacted budget.

The NOS ORF account is reduced by \$18.7 million. Navigation Services has a proposed increase of \$7.5 million. The Ocean Resources, Conservation and Assessment account has a proposed net reduction as compared to the FY 2008 enacted budget of \$25.7 million. This includes a \$19.9 million reduction in the Ocean Assessment Program (OAP), \$2.8 million decrease in Response and Restoration, and \$2.9 million reduction in the National Centers for Coastal Ocean Science (NCCOS). The Ocean Assessment Program includes funding for the Integrated Ocean Observing System (IOOS) was \$26.4 million. The FY 2009 request would reduce funding for IOOS by \$5.3 million to \$21 million. The FY 2008 enacted budget for the Ocean and Coastal Zone Management accounts would receive a slight reduction (approximately \$469,000). The NOS-PAC accounts are also reduced, by \$29.2 million. This includes cuts in both the Marine Sanctuaries Construction (\$8.3 million) and four congressionally mandated construction acquisition projects (a total of \$23.3 million).

Program Support:

The Program Support account funds corporate services and agency management. This includes the Under Secretary's office, the office of the Chief Financial Officer, and the Program, Planning and Integration Office. Overall, the Administration requests an increase in the Program Support account of \$73.4 million (a 16 percent increase) as compared to the FY 2008 enacted funding level. Most of this increase is due to continued construction of facilities under the PAC accounts (\$63.8 million), in particular the Pacific Regional Center in Honolulu (\$40.3 million).

The Program Support account also includes the NOAA Education Program. The proposed funding for NOAA education programs is again reduced significantly below its current funding level of \$34 million for FY 2008 to a proposed funding level of \$17 million for FY 2009. The Administration proposes to eliminate completely eleven education programs including the JASON education and outreach program. The Administration has proposed significant reductions for Competitive Education Grants; an 80 percent reduction below the FY 2008 enacted funding level.

GAO's Report on Aviation Weather Service

The National Weather Service (NWS) weather products are a vital component of the Federal Aviation Administration's (FAA) air traffic control system. NWS provides aviation weather products and services to FAA through the Aviation Weather Center and the weather forecast offices across the country. The Aviation Weather Center is located in Kansas City, Missouri and is staffed by 65 personnel. There are 122 weather forecast offices, which issue terminal area forecasts for approximately 625 locations every six hours and in real time as conditions change.

In addition, NWS provides direct contact with FAA staff through individual center weather service units (CWSUs). Under an interagency agreement, NWS provides CWSU meteorologists at each of the FAA's 21 en route centers in addition to providing products and services developed at the other NWS facilities. FAA's en route centers control air traffic over the national air space as planes are in transit and on the approach to some airports. The CWSU meteorologists provide air traffic managers with forecast and weather briefings on regional conditions including icing, turbulence, visibility, and freezing precipitation. Under the current terms of this interagency agreement, FAA reimburses NWS \$12 million annually for CWSU support.

NWS's meteorologists utilize various systems to collect and analyze data compiled from both the NWS and FAA weather sensors. Key systems used are FAA's Weather and Radar Processor, FAA's Integrated Terminal Weather System, and a remote display of NWS's Advanced Weather Interactive Processing System (AWIPS). Also, the NWS meteorologists provide key services such as meteorological impact statements, center weather advisories, periodic briefings, weather information interpretations, and on-demand consultations.

A few years ago, FAA began to explore options to reduce costs associated with the aviation weather services provided by NWS at its en route centers. In 2005, FAA requested that NWS restructure its aviation weather services to consolidate offices, provide remote services, and reduce the annual cost of providing services by \$2 million. In response, NWS offered FAA a proposal to supply aviation weather services through the local forecast office closest to the en route centers. This proposal removed CWSU meteorologists from the en route centers and achieved the cost sav-

ings requested by FAA. FAA did not accept the proposal and instead initiated a review to more clearly define its requirements for weather forecasting at the en route centers.

In October 2006, FAA also explored the possibility of acquiring aviation weather services from an organization other than NWS. FAA developed and released a market survey to solicit initial information from the private sector and other government organizations to determine if they could provide remote weather services at a lower cost than NWS. Ten organizations, including private sector firms and government-funded laboratories, responded that they could provide the services that FAA wanted and at a reduced cost.

One year ago, five Members of the Committee on Science and Technology asked the Government Accountability Office (GAO) to evaluate the efforts of FAA and NWS to restructure aviation weather technologies and services. The Committee wished to ensure that restructure of these services would not result in any degradation of services provided to guide air traffic management. Problems associated with weather conditions contribute to significant delay of air traffic. Also, accurate forecasting of weather conditions is essential to maintaining safety of aircraft.

The GAO completed its review in December and will report on its findings. Shortly after GAO completed its review, FAA released two documents: a Center Weather Service Unit Quality Assurance Surveillance Plan and a Requirements Document. FAA provided these documents to NWS on December 19 and asked NWS to provide their response to the documents within 120 days. The Director of NWS, Dr. Jack Hayes, and the Senior Vice President for Finance, Air Traffic Organization of the FAA will provide their responses to GAO's recommendations and an update on the current status of their joint efforts to restructure aviation weather services.

Chairman LAMPSON. This hearing will come to order. Everyone, good afternoon, and I want to welcome everyone to today's Subcommittee hearing on the National Oceanic and Atmospheric Administration, or NOAA, fiscal year 2009 budget request, and GAO's report on aviation weather services.

NOAA is an important agency that provides our citizen with warnings of severe weather, guides the management of our ocean and coastal resources, and conducts research to improve our understanding of the environment. NOAA is a diverse agency with many important missions and responsibilities. However, issuing watches and warnings for severe storms may be the role for which NOAA is the most famous.

I know that in Texas we appreciate their services because we experience severe storms every year in the form of tornadoes and hurricanes. The watches, warnings, and forecasts issued by the National Hurricane Center and the local forecasting offices of the National Weather Service contain vital public safety information. The partnership between the National Weather Service, the media, and the emergency management community is essential to protect lives and property damage associated with these storms.

Accurate predication of hurricanes and other severe storms and sound management of ocean and coastal resources can only be achieved in sound investments in the personnel, equipment, and research at NOAA.

There are some encouraging features of the fiscal year 2008 budget request for NOAA. For the first time in years, the President has requested an increase for this agency over the current year's funding level. This is certainly a step in the right direction. We are pleased to see additional funds requested to restore some climate sensors and to upgrade a variety of models, technology and software systems. However, I believe the Administration's budget proposal still lacks the level of funding needed for his agency to truly fulfill all of its diverse missions.

If NOAA is to continue to provide the array of services we need, if it is to advance its capabilities to forecast the weather and our understanding of the oceans and the atmosphere, if we are to restore our fisheries and coastal ecosystems to a productive and healthy state, we must invest additional funds in this agency. The Committee will continue to follow closely the procurements for the new polar and geostationary weather satellite systems. It is essential that we have these new systems completed and delivered in time to avoid any gaps in coverage of weather data. With respect to the new geostationary satellite program, GOES-R, I believe the Agency has acted upon the recommendations of the GAO and the experience of the NPOESS program in a manner that is moving this procurement in the right direction. I remain concerned about the status of the NPOESS program, a key instrument, VIIRS, is still not completed, and the schedule for launching the preparatory mission is, once again, delayed.

Costs for new satellite systems have grown well beyond any recognized figure for inflation. We are going to have to address this for the long-term. We have become more dependent upon satellite information for our forecasting, observing, and understanding climate and weather phenomena.

The needs are growing, but the budgets are not expanding to provide the additional funds necessary to accommodate these needs. For example, we still don't have plans or budgets in place to accommodate the need for a follow-on operational instrument to replace NASA's QuikSCAT satellite, or for the full suite of climate instruments that were eliminated from the NPOESS program.

During the second part of today's hearing, GAO will report its findings on the current effort by FAA and NWS to restructure aviation weather-forecasting services. One year ago, five other Members of the Committee joined me in a request to GAO to review this effort. As we all know, and have personally experienced while traveling by plane, flight delays and cancellations due to inclement weather are an all too common occurrence, and there is more than convenience at stake here. There is a question of safety.

Severe storms or rapidly changing conditions can create serious risks for aircraft. It was a tragic, fatal crash in 1977 that led to the formation of the Center Weather Forecast Units that we still have today. FAA and NWS should be working together, cooperatively, to ensure the smooth, safe flow of air traffic in our nation. We want to ensure that as these agencies evaluate the aviation weather-forecasting program, they keep these essential goals in mind.

Any restructuring of aviation weather-forecasting services must be done in a manner that will ensure, at a minimum, that there is no degradation in these services going forward. There are no cost savings or efficiencies to be found by reducing the safety of air travel for the public.

I look forward to hearing all of the testimony this afternoon, and as we discussed, the Administration's budget proposal and the aviation weather services, provided by NOAA and FAA.

And at this time, I would like to recognize our distinguishing Ranking Member Inglis of South Carolina, for his opening statement.

[The prepared statement of Chairman Lampson follows:]

PREPARED STATEMENT OF CHAIRMAN NICK LAMPSON

Good Afternoon. I want to welcome everyone to today's Subcommittee hearing on the National Oceanic and Atmospheric Administration (NOAA) FY 2009 Budget Request and GAO's Report on Aviation Weather Services.

NOAA is an important agency that provides our citizens with warnings of severe weather; guides the management of our ocean and coastal resources; and conducts research to improve our understanding of the environment.

NOAA is a diverse agency with many important missions and responsibilities. However, issuing watches and warnings of severe storms may be the role for which NOAA is the most famous.

I know in Texas we appreciate their services because we experience severe storms every year in the form of tornadoes and hurricanes.

The watches, warnings, and forecasts issued by the National Hurricane Center and the local forecasting offices of the National Weather Service contain vital public safety information.

The partnership between the National Weather Service, the media and the local emergency management community is essential to protect lives and property damage associated with these storms.

Accurate prediction of hurricanes and other severe storms and sound management of our ocean and coastal resources can only be achieved through sound investments in the personnel, equipment, and research at NOAA.

There are some encouraging features of the FY 2009 budget request for NOAA. For the first time in years, the President has requested an increase for this agency over the current year's funding level. This is certainly a step in the right direction.

We are pleased to see additional funds requested to restore some climate sensors and to upgrade a variety of models, technology and software systems. However, I believe the Administration's budget proposal still lacks the level of funding needed for this agency to truly fulfill all of its diverse missions.

If NOAA is to continue to provide the array of services we need, if it is to advance its capabilities to forecast the weather and our understanding of the oceans and the atmosphere, if we are to restore our fisheries and coastal ecosystems to a productive and healthy state, we must invest additional funds in this agency.

The Committee will continue to follow closely the procurements for the new polar and geostationary weather satellite systems. It is essential that we have these new systems completed and delivered in time to avoid any gaps in coverage of weather data.

With respect to the new geostationary satellite program—GOES-R—I believe the Agency has acted upon the recommendations of the GAO and the experience of the NPOESS program in a manner that is moving this procurement in the right direction.

I remain concerned about the status of the NPOESS program. A key instrument—VIIRS (VEERS)—is still not completed and the schedule for launching the preparatory mission is once again delayed.

Costs for new satellite systems have grown well beyond any recognized figure for inflation. We are going to have to address this for the long-term. We have become more dependent upon satellite information for forecasting, observing and understanding climate and weather phenomena.

The needs are growing, but the budgets are not expanding to provide the additional funds necessary to accommodate these needs.

For example, we still do not have plans or budgets in place to accommodate the need for a follow-on operational instrument to replace NASA's QuikSCAT satellite or for the full suite of climate instruments that were eliminated from the NPOESS program.

During the second part of today's hearing, GAO will report its findings on the current effort by FAA and NWS to restructure aviation weather forecasting services.

One year ago, five other Members of the Committee joined me in a request to GAO to review this effort.

As we all know and have personally experienced when traveling by plane, flight delays and cancellations due to inclement weather are an all-too-common occurrence. But there is more than convenience at stake here. There is also a question of safety.

Severe storms or rapidly changing conditions can create serious risks for aircraft. It was a tragic, fatal crash in 1977 that led to the formation of the Center Weather Forecast Units we still have today.

FAA and NWS should be working together cooperatively to ensure the smooth, safe flow of air traffic in our nation. We want to ensure that as these agencies evaluate the aviation weather forecasting program, they keep these essential goals in mind.

Any restructuring of aviation weather forecasting services must be done in a manner that will ensure at a minimum there is no degradation in these services going forward. There are no cost savings or efficiencies to be found by reducing the safety of air travel for the public.

I look forward to hearing all of the testimony this afternoon, as we discuss the Administration's budget proposal and the Aviation Weather Services provided by NOAA and FAA.

At this time, I would like to recognize our distinguished Ranking Member, Mr. Inglis of South Carolina, for his opening statement.

Mr. INGLIS. Thank you, Mr. Chairman. Thank you for holding this hearing on the President's fiscal year 2009 request for NOAA.

The accomplishments that you highlighted in your testimony are proof that the money Congress spends on science is money well spent, and often, its effects go far beyond the laboratory. You won't often hear a conservative happy about spending more money, but it is good to see that the NOAA 2009 budget proposal is just as aggressive, if not more so, than last year, and rightfully so. We need to continue to make sure that NOAA has the resources necessary to continue providing the best services possible in hurricane forecasting, climate modeling, coastal research, critical satellite tech-

nology, and many other areas that benefit our country and the world.

I also look forward to hearing from our second panel of witnesses from GAO, the National Weather Service and the Federal Aviation Administration. I was an original requester on the GAO report on aviation weather because I am concerned about the ongoing issues between these two agencies.

Weather has a significant impact, as the Chairman was saying, on our flying public, and there have been numerous studies that document the cost of weather delays to the airline industry and to the economy at large. GAO report and Administrator Hayes' testimony offer an encouraging sign that progress is already underway in achieving agreement between the FAA and the National Weather Service on much needed performance issues.

In the case of Dr. Hayes, I am especially interested to know whether or not the National Weather Service is prepared to meet the Federal Aviation Administration's recently imposed requirements by the May 2008 deadline, or if more time is necessary.

I thank the witnesses for being here today, and I look forward to hearing their testimony, and I yield back the balance of my time, Mr. Chairman.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Good afternoon. Thank you, Chairman Lampson, for holding this hearing about the President's Fiscal Year 2009 request for the National Oceanic and Atmospheric Administration.

The accomplishments that you highlighted in your testimony, Admiral Lautenbacher, are proof that the money Congress spends on science is money well spent, and often its effects goes far beyond the laboratory. You won't often hear a conservative happy about spending more money, but it's good see that the NOAA FY 2009 budget proposal is just as aggressive, if not more so, than last year, and rightfully so. We need to continue to make sure that NOAA has the resources necessary to continue providing the best services possible in hurricane forecasting, climate modeling, coastal research, critical satellite technology, and many other areas that benefit our country and the world.

I also look forward to hearing from our second panel witnesses from GAO, the National Weather Service (NWS) and the Federal Aviation Administration (FAA). I was an original requester on the GAO report on Aviation Weather, because I am concerned about the on-going issues between these two agencies.

Weather has a significant impact on the National Aviation System and there have been numerous studies that document the cost of weather delays to the airline industry and to the economy at large. The GAO report and Assistant Administrator Hayes' testimony offer encouraging signs that progress is already underway in achieving agreement between the FAA and NWS on much-needed performance measures. Mr. Hayes, I'm especially interested to know whether or not the NWS is prepared to meet the Federal Aviation Administration's recently proposed requirements by the May 2008 deadline, or if you feel more time is necessary.

I thank our witnesses for being here today and I yield back the balance of my time.

Chairman LAMPSON. Thank you, Mr. Inglis. I ask unanimous consent that all additional opening statement be submitted by the Subcommittee Members be included in the record. Without objection, so ordered.

[The prepared statement of Mr. Costello follows:]

PREPARED STATEMENT OF REPRESENTATIVE JERRY F. COSTELLO

Mr. Chairman, I would like to thank you for overseeing this budget hearing today and I'd also like to thank our panelists who are testifying this afternoon. As Chair-

man of the Aviation Subcommittee of the Transportation and Infrastructure Committee, I look forward to learning from our witnesses about efforts to improve the weather technologies and services provided to guide air traffic management.

One year ago, I, along with other Members of this committee, asked the Government Accountability Office to evaluate the efforts of the Federal Aviation Administration and the National Weather Service (NWS) to restructure its technologies and services. We asked GAO to pay particular attention to the management of the Center Weather Service Units, their staffing, and the streamlining of information unit-wide. The NWS services, products and information are a vital component of the FAA's air traffic control system. As we stated in the letter, I am interested in ensuring that any restructuring of the relationship between these two agencies will not result in the degradation of services provided to guide air traffic management.

I know that the Members of this committee, like me, are committed to ensuring that quality information is provided through an efficient, collaborative relationship between the NWS and FAA. I think everyone can agree that the management of the Center Weather Service Units and the services they provide can be improved. I am pleased that with the completion of the GAO study and our Committee hearing today, we can now take a further step towards this goal.

Mr. Chairman, I commend you for your stewardship of this committee and I look forward to hearing from our witnesses on this matter. Thank you.

[The prepared statement of Mr. Wu follows:]

PREPARED STATEMENT OF REPRESENTATIVE DAVID WU

I appreciate the opportunity to join the Energy and Environment Subcommittee regarding NOAA's Fiscal Year 2009 budget request.

In 2006, Congress passed and the president signed into law, the Tsunami Warning and Education Act—to improve our tsunami warning capabilities. We made commitments to improve our detection systems on a global level that will improve tsunami forecasting. These systems are important, but they are not an end-all to protect communities. These communities need to know how to respond to a tsunami quickly. The Science Committee determined this legislation relied too heavily on detection and too little on preparation. To address this problem, we amended the bill to ensure that 27 percent of all funds appropriated would be used for the National Tsunami Hazard Mitigation Program.

The National Tsunami Hazard Mitigation Program helps communities at the State, tribal and local level plan and prepare for tsunamis. Communities in my district along the Pacific Coast rely on this program to help prepare residents quickly and allow them to safely evacuate in the event of a tsunami. While a detection system is important, the Cascadian subduction zone lies only nine miles off the Oregon and Washington Coast. In the event of an earthquake, residents need to react immediately because a detection system will not provide information in a timely matter.

However, NOAA has ignored Congressional intent to ensure the National Tsunami Hazard Mitigation Program is properly funded. In Fiscal Year 2008, NOAA funded the program at \$2.085 million. This represents 8.9 percent of total funding, 18 percent below the statutorily required 27 percent. The legislation and Committee report both emphasize the importance and purpose for this level of funding for NTHMP.

Looking forward, NOAA's Fiscal Year 2009 budget request keeps funding level for this program. I have serious concerns that NOAA's actions will place communities on the Pacific Coast at risk. I hope NOAA will address these concerns during today's hearing.

Chairman LAMPSON. And it is my pleasure to introduce our first witness this afternoon, Vice Admiral Conrad Lautenbacher, as the Under Secretary of Commerce for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Association. Admiral, as always, you will have five minutes for your spoken testimony. Your full, written testimony will be included in the record for the hearing, and when you have completed your testimony, we will begin with questions, and each Member will have five minutes to ask those questions. And you may begin.

Panel I**STATEMENT OF VICE ADMIRAL CONRAD C. LAUTENBACHER, JR., UNDER SECRETARY OF COMMERCE FOR OCEANS AND ATMOSPHERE; NOAA ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE**

Vice Admiral LAUTENBACHER. Thank you, Chairman Lampson, Ranking Member Inglis, Congressman Wu, and distinguished staff Members, thank you for the opportunity to appear before you this afternoon. And let me begin by giving you my sincere appreciation from NOAA for your support and interest in our programs. It is only with your help that we are doing as well as we are, so thank you very much.

The President's budget supports NOAA's priority to advance mission-critical services. As you mentioned, the request is higher than last year. It is \$4.1 billion, which is a \$200 million, or a five percent increase, above the 2008 enacted level. The increases that are there are essentially in areas for satellite facilities, ocean, and fisheries activities. While it is an increased budget, I want to emphasize that it is the minimum that we need to obtain our current level of services and carry out mission, which is to understand and to predict changes in the Earth environment and to conserve and manage coastal, marine, and Great Lakes resources.

We have had many notable accomplishments during the past fiscal year. I mention some of those in my written testimony. I would like to just mention a couple before we move into the budget. First of all, I would like to enter for the record how proud we are of the NOAA scientists, the ones who had the special honor—more than 120 of them recognized by the Nobel Peace Prize Committee for their work on the Intergovernmental Panel on Climate Change, or IPCC. Many people in the NOAA family were intimately involved with the work of the IPCC, even beyond the 120 that received recognition. And this international recognition highlights the pre-eminent science conducted by our agency.

Now, in October 2007, a very important one, as you mentioned, weather warnings. The weather service began issuing more geographically specific warnings for tornadoes, severe thunderstorms, floods, and marine hazards. Basically, these storm-based warnings allowed forecasters to pinpoint the specific area where severe weather threats are the highest. In some cases, this reduced the area warned by 70 percent when compared to the previously used county-by-county warning system. We believe this will cut down on the amount of false alarms and improve people's opportunities to understand that it is serious and escape harm from severe weather events.

We continued to expand the overall tsunami-warning capability in our country. We deployed 14 more deep ocean assessment and reporting buoys, bringing the total stations to 34. In partnership with the government of Indonesia, we also launched a second buoy to warn of approaching tsunamis in that region, and four buoys to monitor climate. We are now covering the Indian Ocean as well as the Pacific. These buoys are the latest additions to the expanding

global Earth observation system of systems, an international effort to monitor and predict changes in the Earth.

My written testimony presents details of the budget. Again, I will move on the 2009 budget. We are requesting almost \$931 million in 2009 for the Weather Service, an increase of just over \$19 million from 2008. We are requesting restoration of critical core weather service accounts that were reduced in the fiscal year 2008 omnibus. These restorations at just over \$10 million include almost \$7 million to the local warnings and forecast-based programs. There is about \$11 million in the budget that would help enhance the NOAA all-hazard radio program. As you know, these radios provide crucial information and warnings to the public, 24 hours a day. As we saw recently with the outbreak of tornadoes in the Midwest, we must remain vigilant at all times.

To enhance our forecasting abilities and ensure consistency, we are requesting a funding increase of \$242 million, for a total of \$477 million to continue support of the Next-Generation Geostationary Satellite Program, called GOES-R. These sentinels in the sky provide the images of severe weather you see on TV. This increase will be used continued systems engineering, development of instrumentations, and transition to acquisitions and operations. We plan to issue the major contracts for space and ground segments early in 2009. This is a critical time for this program, and we need to work to keep it on track.

We spend more than \$300 million a year for hurricane warning and forecast effort. In 2009, we will add over \$19 million in new increases, providing \$5 million for improvements to hurricane forecast and storm-surge modeling; \$8 million will go towards research in ocean vector wind studies and coastal inundation modeling and \$6 million to help support operation of our hurricane data buoys.

In 2009, NOAA will invest more than \$319 million on climate-related activities. This is an increase of \$85 million over the 2008 enacted. NOAA will support the critical NIDIS system, National Integrated Drought Information System, with increases of \$2 million. We are requesting an increase of \$74 million for climate sensors that were removed from the NPOESS satellite program. The money is specifically for the TSIS and CERES instruments which measure the Earth's radiation budget.

Finally, we have modest new investments in our priority areas, I believe, while maintaining critical services. We will build on the successes from last year. We stand ready to meet the challenges that will surface in 2009.

Again, I thank you for the opportunity to be present with you this afternoon, and I am happy to answer any questions you may have. Thank you, Mr. Chairman.

[The prepared statement of Vice Admiral Lautenbacher follows:]

PREPARED STATEMENT OF VICE ADMIRAL CONRAD C. LAUTENBACHER, JR.

Mr. Chairman and Members of the Committee, before I begin my testimony I would like to thank you for your leadership and the generous support you have shown the National Oceanic and Atmospheric Administration (NOAA). Your continued support for our programs is appreciated as we work to improve our products and services for the American people. Thank you for the opportunity to testify on the President's Fiscal Year (FY) 2009 Budget Request for NOAA.

The FY 2009 President's Budget supports NOAA's priority to advance mission-critical services. The FY 2009 request is \$4.1 billion, which represents a \$202 mil-

lion or 5.2 increase over the FY 2008 enacted level. This request includes the level of resources necessary to carry out NOAA's mission, which is to understand and predict changes in the Earth's environment, and conserve and manage coastal and marine resources to meet our nation's economic, social and environmental needs. At NOAA we work to protect the lives and livelihoods of Americans, and provide products and services that benefit the economy, environment, and public safety of the Nation. Before I discuss the details of our FY 2009 budget request, I would like to briefly highlight some of NOAA's notable successes from the past fiscal year (2007).

FY 2007 ACCOMPLISHMENTS

NOAA is Major Contributor to Nobel Prize-Winning Intergovernmental Panel on Climate Change Reports

Scientists from NOAA's Earth System Research Laboratory were among those sharing in the 2007 Nobel Peace Prize. The scientists were recognized for their contributions to the Intergovernmental Panel on Climate Change (IPCC). The IPCC was created in 1988 by the World Meteorological Organization and the United Nations Environment Program to provide regular assessments for policy-makers of the scientific, technical and socioeconomic aspects of climate change. IPCC has produced its major assessments every five to six years since 1990.

NOAA scientists served as contributors to and government reviewers of the Fourth IPCC Assessment Report. NOAA's Geophysical Fluid Dynamics Laboratory provided model runs that enhanced the projections used in the IPCC report.

Magnuson-Stevens Act Implementation

The *Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2007* was signed into law on January 12, 2007. The reauthorized Act contains significant new provisions to end overfishing, promote market-based approaches to fisheries management, improve the science used in fisheries management, improve recreational data collection, enhance international cooperation in fisheries management, and address illegal, unreported, and unregulated fishing, as well as by-catch of protected living marine resources. Especially notable is the requirement to establish an annual catch limit for each fishery, which for the first time creates a mandate with a timetable to end overfishing.

Progress on Next Generation Geostationary Satellite Program

Geostationary satellites remain the weather sentinels for NOAA. The next-generation geostationary satellite series, GOES-R, will provide new and improved atmospheric, climatic, solar, and space data. In 2007, NOAA revised the management and acquisition strategy for the GOES-R program, partnering more closely with NASA to take advantage of each agency's technical expertise. In February 2007, the Advanced Baseline Imager, the main instrument on GOES-R, completed a key milestone, enabling the contractor to begin building the first instrument. Throughout 2007, NOAA awarded the three remaining instrument contracts for the Solar Ultraviolet Imager, Extreme Ultra Violet and X-Ray Irradiance Sensors, and Geostationary Lightning Mapper. These instruments will help us to understand and forecast solar disturbances as well as track lightning strikes from space.

NOAA's National Weather Service Provides More Specific Warning Information for Severe Weather

NOAA's National Weather Service (NWS) began issuing more geographically specific warnings for tornadoes, severe thunderstorms, floods, and marine hazards on October 1, 2007. The new "storm-based warnings" allow forecasters to pinpoint the specific area where severe weather threats are highest, thereby reducing the area warned by as much as 70 percent when compared to the previously used county-by-county warning system. Storm-based warnings are displayed graphically and are extremely adaptable to cell phones, PDAs, and the Internet. The Emergency Alert System (EAS) is geared toward counties and NOAA Weather Radio (NWR) All Hazards will still sound an alarm if there is a warning anywhere in a county. However, text and audio messages will provide more specific information about the location of the storm in the county, and the direction in which it is moving. Storm-based warnings will reference landmarks such as highways, shopping centers, and parks, and will use directional de-limiters to indicate county location.

Fleet Modernization Moves Ahead

In June 2007, NOAA celebrated the keel laying of NOAA ships BELL M. SHIMADA and FERDINAND R. HASSLER in Moss Point, Mississippi. This marked the first time NOAA has celebrated this important construction milestone for two ships simultaneously. HENRY B. BIGELOW, second of the four fisheries survey vessels of the same class being built by VT Halter Marine, was commissioned into the

fleet in July before beginning operations in New England. In September, Phase I of conversion of NOAA Ship OKEANOS EXPLORER (formerly USNS CAPABLE) to an ocean exploration ship was completed. NOAA ship PISCES was christened in December and subsequently launched in Moss Point, Mississippi.

New State-of-the-Art Satellite Operations Facility Officially Opened

In June 2007, NOAA and the General Services Administration officially opened the new state-of-the-art NOAA Satellite Operations Facility (NSOF). NSOF is the new home for NOAA's around-the-clock environmental satellite operations, which provides data critical for weather and climate prediction. NSOF supports more than \$50 million of high technology equipment, including 16 antennas monitoring the operations of 16 on-orbit satellites.

National Water Level Observation Network Upgraded to Real-time Status

The National Ocean Service (NOS) completed a three-year effort to upgrade the technology of its National Water Level Observation Network (NWLON). NWLON stations provide mariners, first responders, and the public with real-time tide and water-level information. A major benefit of the upgrade is that network stations normally equipped to transmit water-level and other environmental data at hourly increments via NOAA Geostationary Operational Environmental Satellites now transmit data every six minutes, thus enabling users to access data more quickly.

NOAA Aids in the Recovery of Fisheries and Fishing Communities Damaged by Hurricanes

NOAA funded and conducted a number of activities aimed at helping Gulf Coast fisheries recover from the devastating impacts of Hurricanes Katrina, Rita, and Wilma, which struck the Gulf Coast in 2005. The states are using these funds to restore and rehabilitate oyster, shrimp, and other marine fishery habitats damaged or destroyed by hurricane events, and to conduct cooperative research and monitoring and other activities designed to recover and rebuild Gulf of Mexico fisheries and fishing communities.

NOAA Weather Radio All Hazards Activities: Meeting the Expectations of the Nation for Weather and All Hazard Warning Information

NOAA's National Weather Service added 16 broadcast stations to the NOAA Weather Radio (NWR) All Hazards network in 2007. In addition to achieving 100 percent coverage of high-risk areas, NOAA refurbished 62 broadcast stations with technology upgrades that significantly improved reliability and availability, while decreasing maintenance costs. This allows the network to meet expectations of availability as the Nation's weather and all-hazard warning system.

NWR is a reliable and inexpensive means of communicating weather, hazard, and emergency information directly to the public. The network infrastructure consists of 986 broadcast stations covering 98 percent of the Nation's population and has the ability to deliver messages to individuals monitoring their own receivers as well as the ability to reach millions of listeners and viewers through the Emergency Alert System, which is monitored by television and radio license holders. The network is required to broadcast to all areas of the United States identified as being at high risk of experiencing severe weather and to sustain a high level of reliability and maintainability in those areas.

Marine Reserves Established in Channel Island National Marine Sanctuary

In 2007, NOS established the federal portion of the marine reserves and conservation area network within the Channel Islands National Marine Sanctuary. This is the largest network of marine reserves in federal waters in the continental United States. This action complements the State of California's established network of marine reserves and conservation areas within the State waters of the sanctuary in 2003.

Expanding U.S. Tsunami Preparedness

NOAA's National Weather Service (NWS) is responsible for the expansion of the U.S. network of tsunami detection sensors. During 2007, 14 Deep-ocean Assessment and Reporting of Tsunamis (DART™) buoys were established: four in the western Pacific Ocean, three off the Pacific Coast of Central America, five in the north-western Pacific Ocean, and two in the North Atlantic Ocean, bringing the total number of U.S. DART™ stations to 34. The United States, with NOAA as lead agency, is currently working with approximately 70 countries, the European Commission, and over 50 non-governmental agencies in planning and implementing the Global Earth Observation System of Systems (GEOSS), which includes a global tsunami warning system. In addition, NWS works with communities to prepare for tsunamis

through the TsunamiReady™ Program. As of December 12, 2007, there are 47 TsunamiReady™ sites in 10 states, Puerto Rico, and Guam. The National Weather Service reached its goal of recognizing 10 new TsunamiReady™ communities in fiscal year 2007.

First Buoy to Measure Acidification Launched

The first buoy to directly monitor ocean acidification was launched in the Gulf of Alaska. Ocean acidification is a result of carbon dioxide absorbed by the ocean. The new buoy, part of a National Science Foundation project awarded to PMEL and the University of Washington in Seattle, in collaboration with Fisheries and Oceans Canada and the Institute of Ocean Sciences in British Columbia, measures the air-sea exchange of carbon dioxide, oxygen, and nitrogen gas, in addition to the pH (a measure of ocean acidity) of the surface waters. The buoy is anchored in water nearly 5,000 meters deep and transmits data via satellite. Rising acidity in the ocean could have a detrimental effect on ocean organisms, with resulting impacts on ocean life and the food chain.

NOAA Ships Arrive at New Home Port in Hawaii

NOAA ships OSCAR ELTON SETTE, HI'IALAKAI, and KA'IMIMOANA relocated to their new home port at Ford Island, Pearl Harbor, Hawaii, heralding the permanent presence of NOAA on Ford Island. This was a major milestone in the multi-year, multi-phase construction of the NOAA Pacific Regional Center, a project to consolidate NOAA programs and operations on the island of Oahu into a single facility on Ford Island.

NOAA's Open Rivers Initiative Completes First Projects

In its first year, NOAA's Open Rivers Initiative completed three projects that restored over 30 miles of spawning and rearing habitat for migratory fish. The obsolete Brownsville Dam, located on the Calapooia River in Oregon, was removed in August 2007, effectively eliminating an obstruction to migratory fish and a safety hazard to the local human community. In California, two failing and undersized culverts were removed, allowing endangered salmon to reach their historic spawning and rearing grounds. In collaboration with local communities, NOAA's Open Rivers Initiative will continue to restore free fish passage to historic habitat by removing obsolete dams and barriers that dot the rivers of coastal states.

Delivering Real-Time Data to Help Shellfish Growers

Shellfish growers in the Pacific Northwest can now get near real-time water quality data from the System-wide Monitoring Program operating at National Estuarine Research Reserves in Alaska, Washington, and Oregon. The data are available through telemetering capabilities, which measure, receive, and transmit data automatically from distant sources. Water quality data can be viewed on a web site jointly sponsored by NOS and the Northwest Association of Networked Ocean Observing Systems (<http://www.nanoos-shellfish.org/>). Water quality and weather data are transmitted every 30 minutes via satellite from monitoring stations at all 27 National Estuarine Research Reserves, providing information to the growing Integrated Ocean Observing System (IOOS).

Great Lakes Lab Recognized for 'Green' Research Vessels

NOAA's Great Lakes Environmental Research Laboratory (GLERL) converted a fleet of research vessels from petroleum-based to 100 percent bio-based fuel and lubricants, earning a White House Closing-the-Circle Award in the green purchasing category. GLERL operates research vessels throughout the Great Lakes region as scientific platforms for ecosystems research and other NOAA interests in the area. The conversion was a result of a call for "greening" of government agencies through waste reduction, recycling, and the use of environmentally friendly and sustainable products including bio-products.

FY 2009 BUDGET REQUEST HIGHLIGHTS

Supporting the President's Ocean Initiative

Building on last year's investment in Ocean Initiative related activities, the FY 2009 President's Request includes new increases of \$49.1 million for NOAA over the FY 2008 President's Request to support the President's Ocean Initiative. This ocean initiative includes more funding to advance ocean science and research; protect and restore marine and coastal areas; and ensure sustainable use of ocean resources.

New investments in ocean science are aimed at monitoring and better understanding marine ecosystems. Increased funding of \$7.0 million is included for the Integrated Ocean Observing System (IOOS) to support Data Management and Communications, Regional Observations, and the Data Assembly Center (DAC), which

delivers real-time, quality controlled data from NOAA and regional observing systems. An increase of \$1 million is requested to manage the escalating size and quantity of hydrographic data sets collected by NOAA and other providers. This increase in funding will help NOAA update the nautical charts provided to mariners navigating on U.S. waters in a more timely fashion. In addition, NOAA is requesting \$2 million in increased funding for the PORTS® program, to improve and expand the delivery of real-time and forecasted navigation information. A recent economic benefits study of the Houston/Galveston PORTS® program, released in May 2007, showed that the program brought the Houston/Galveston area significant economic benefits and has helped to achieve a 50 percent reduction in groundings.

Projects to protect and restore valuable marine and coastal areas include funding of \$4 million to implement the newly enacted *Marine Debris Research, Prevention, and Reduction Act*. This funding will allow NOAA to provide competitive grants and to develop the first federal clearinghouse on marine debris. NOAA also requests increased funding of \$5.4 million for the Open Rivers program to restore stream miles of fish habitat through watershed-level projects with multiple fish passage opportunities.

Finally, the budget provides support to ensure sustainable access to seafood through the development of offshore aquaculture and better management of fish harvests. In direct support of new provisions of the MSRA, and to provide better management of fish harvests, NOAA requests increased funding of \$31.8 million over the FY 2008 enacted level. Of this amount, \$5.1 million is requested to enhance the independent peer-review process for scientific data required to appropriately set the annual catch limits for all managed fisheries; \$8.5 million will initiate and expand existing sampling programs and management procedures in order to end over-fishing by 2011, as mandated by the MSRA; and \$3.0 million will complete the final implementation phase of a new registry system for recreational fishermen and for-hire fishing vehicles. An additional \$1.5 million increase is requested in support of deep sea coral research, allowing NOAA to begin identifying, understanding, and providing the information needed in order to protect deep coral habitats.

Sustaining Critical Operations

As always, I support NOAA's employees by requesting adequate funding for our people, infrastructure, and facilities. NOAA's core values are people, integrity, excellence, teamwork, ingenuity, science, service, and stewardship. Our ability to serve the Nation and accomplish the missions outlined below is determined by the quality of our people and the tools they employ. Our facilities, ships, aircraft, environmental satellites, data-processing systems, computing and communications systems, and our approach to management provide the foundation of support for all of our programs. Approximately \$42.0 million in net increases will support our workforce inflation factors, including \$37.5 million for salaries and benefits and \$4.5 million for non-labor-related adjustments, such as fuel costs.

This year we have focused our increases on satellite continuity and operations and maintenance support for our aircraft and NOAA vessels. A funding increase of \$242.2 million is requested to continue support of the Geostationary Operational Satellites (GOES)-R program. GOES satellites provide critical atmospheric, oceanic, climatic, and solar products supporting weather forecasting and warnings, climatologic analysis and prediction, ecosystems management, and safe and efficient public and private transportation. This increase will be used for continued systems engineering, development of satellite instruments, risk reduction activities, and transition to the systems-level acquisition and operations phase of the program.

Funding of \$6.1 million is also requested in support of a Major Repair Period for the RAINIER, NOAA's most productive hydrographic vessel. At 39 years old, the RAINIER requires a major capital investment in its mechanical and electrical systems in order to maintain its current operational tempo and reduce risks to personnel, property, and mission capability.

Finally, NOAA requests an increase of \$4.0 million in support of additional flight hours and operations and maintenance for our aircraft. The requested funds will provide an additional 1,295 flight hours for hurricane research, surveillance, and reconnaissance, as well as for other research and forecasting requirements. NOAA also asks this year for restoration to several of our base programs, most notably in the National Weather Service and the National Marine Fisheries Service. These requested increases in our base accounts will allow NOAA to sustain on-going programs and projects at the levels recommended in the FY 2008 President's Budget.

Improving Weather Warnings and Forecasts

Severe weather events cause \$11 billion in damages and approximately 7,000 weather-related fatalities yearly in the United States. Nearly one-third of the U.S.

economy is sensitive to weather and climate. Realizing this, NOAA seeks to provide decision-makers with key observations, analyses, predictions, and warnings for a variety of weather and water conditions to help protect the health, life, and property of the U.S. and its economy. Land-falling hurricanes are one of the most physically destructive and economically disruptive extreme events that impact the United States, often causing billions of dollars of damage in their wake. In FY 2009, NOAA will continue to improve our hurricane research and modeling capabilities with a requested increase of \$4.0 million for operational support and maintenance of the next-generation Hurricane Weather Research and Forecasting model and storm surge prediction system, as well as accelerated improvements to that system. Increased funding of \$3.0 million will support the operations and maintenance of 15 hurricane data buoys in the Caribbean, Gulf of Mexico, and the Atlantic Ocean, enhancing our real-time hurricane storm monitoring and observations. NOAA also continues to improve and maintain our weather warning infrastructure, with requested funding of \$6.6 million to upgrade the Advanced Weather Interactive Processing System, the Nation's weather and flood warning system. Increased funding of \$4.8 million will be used to upgrade twelve NOAA Wind Profilers and to perform a tech-refresh on this twenty-year-old radar system. Finally, NOAA is requesting \$2.9 million in increased funding for modernization of the NOAA Weather Radio network.

Climate Monitoring and Research

Society exists in a highly variable climate system, and major climatic events can impose serious consequences on society. Preliminary estimates of the impact of the severe drought which affected the Great Plains and the Eastern United States throughout 2007 are in the range of \$5 billion, with major reductions in crop yields and low stream and lake levels. Continued drought and high winds in the Western United States in 2007 resulted in numerous wildfires, with 3,000 homes and over 8.9 million acres burned, and at least 12 deaths. The FY 2009 Budget Request contains investments in several programs aimed at increasing our predictive capability, enabling NOAA to provide our customers (farmers, utilities, land managers, weather risk industry, fisheries resource managers and decision-makers) with assessments of current and future impacts of climate events such as droughts, floods, and trends in extreme climate events. NOAA continues to build a suite of information, products, and services that will enable society to respond to changing climate conditions. In FY 2009, NOAA will support the critical National Integrated Drought Information System with increases of \$2 million to develop and bring into operation by FY 2010 the next-generation Climate Forecast System, leading to improved climate forecasting products. An increase of \$74 million will be used to develop *Clouds and the Earth's Radiant Energy System* (CERES) and *Total Solar Irradiance Sensor* (TSIS) climate sensors to preserve decades long climate data records. The CERES sensor will measure the Earth's radiation budget, an essential measurement for determining the causes of climate variability and change. The TSIS sensor measures the total energy of the sun falling on the Earth, a measurement used to identify and isolate natural solar variations that impact climate in contrast to other factors, such as human influences on climate.

Critical Facilities Investments

The FY 2009 President's Budget Request also includes important increases for critical facilities, necessary to provide a safe and effective working environment for NOAA's employees.

For FY 2009, NOAA will concentrate their modernization efforts on three main projects. NOAA requests an increase of \$40.2 million for the continued construction of the new Pacific Region Center on Ford Island in Honolulu, Hawaii. This increase in funding will support the continued construction and renovation of two buildings, enabling NOAA to reduce expenditures for rent and relocate operations from their current location in the deteriorating Kewalo Basin and Dole Street Lab Facilities. An increase of \$12.1 million will complete the design and initial preparations for a replacement facility for the Southwest Fisheries Science Center. Finally, \$11.7 million is requested to support the installation of a semi-permanent replacement structure for the at-risk Operations Complex at the NESDIS Command and Data Acquisition Station in Fairbanks, Alaska. The current facility is at risk to experience a major structural failure in the next five years. The requested funding will ensure that NOAA maintains crucial mission operations support for the polar-orbiting satellites, as well as backup support for others.

CONCLUSION

NOAA's FY 2009 Budget Request provides essential new investments in our priority areas while maintaining critical services, reflecting NOAA's vision, mission, and core values. The work NOAA accomplished in 2007 impacted every U.S. citizen.

We will build on our successes from last year, and stand ready to meet the challenges that will surface in FY 2009 and beyond. NOAA is dedicated to enhancing economic security and national safety through research and accurate prediction of weather and climate-related events, and to providing environmental stewardship of our nation's coastal and marine resources. That concludes my statement, Mr. Chairman. Thank you for the opportunity to present NOAA's FY 2009 Budget Request. I am happy to respond to any questions the Committee may have.

BIOGRAPHY FOR VICE ADMIRAL CONRAD C. LAUTENBACHER, JR.

A native of Philadelphia, Pa., retired Navy Vice Admiral Conrad C. Lautenbacher, Ph.D., is serving as the Under Secretary of Commerce for Oceans and Atmosphere. He was appointed Dec. 19, 2001. Along with this title comes the added distinction of serving as the eighth Administrator of the National Oceanic and Atmospheric Administration. He holds an M.S. and Ph.D. from Harvard University in applied mathematics.

Lautenbacher oversees the day-to-day functions of NOAA, as well as laying out its strategic and operational future. The agency manages an annual budget of \$4 billion. The agency includes, and is comprised of, the National Environmental Satellite, Data and Information Services; National Marine Fisheries Service; National Ocean Service; National Weather Service; Oceanic and Atmospheric Research; Marine and Aviation Operations; and the NOAA Corps, the Nation's seventh uniformed service. He directed an extensive review and reorganization of the NOAA corporate structure to meet the environmental challenges of the 21st century.

As the NOAA administrator, Lautenbacher spearheaded the first-ever Earth Observation Summit, which hosted ministerial-level representation from several dozen of the world's nations in Washington July 2003. Through subsequent international summits and working groups, he worked to encourage world scientific and policy leaders to work toward a common goal of building a sustained Global Earth Observation System of Systems (GEOSS) that would collect and disseminate data, information and models to stakeholders and decision-makers for the benefit of all nations individually and the world community collectively. The effort culminated in an agreement for a 10-year implementation plan for GEOSS reached by the 55 member countries of the Group on Earth Observations at the Third Observation Summit held in Brussels February 2005.

He also has headed numerous delegations at international governmental summits and conferences around the world, including the U.S. delegation to 2002 Asia-Pacific Economic Cooperation Ocean Ministerial Meeting in Korea, and 2002 and 2003 meetings of the World Meteorological Organization and Intergovernmental Oceanographic Commission in Switzerland and France, as well as leading the Commerce delegation to the 2002 World Summit on Sustainable Development in South Africa.

Before joining NOAA, Lautenbacher formed his own management consultant business, and worked principally for Technology, Strategies & Alliances Inc. He was President and CEO of the Consortium for Oceanographic Research and Education (CORE). This not-for-profit organization has a membership of 76 institutions of higher learning and a mission to increase basic knowledge and public support across the spectrum of ocean sciences.

Lautenbacher is a graduate of the U.S. Naval Academy (Class of 1964), and has won accolades for his performance in a broad range of operational, command and staff positions both ashore and afloat. He retired after 40 years of service in the Navy. His military career was marked by skilled fiscal management and significant improvements in operations through performance-based evaluations of processes.

During his time in the Navy, he was selected as a Federal Executive Fellow and served at the Brookings Institution. He served as a guest lecturer on numerous occasions at the Naval War College, the Army War College, the Air War College, The Fletcher School of Diplomacy, and the components of the National Defense University.

His Navy experience includes tours as Commanding Officer of USS HEWITT (DD-966), Commander Naval Station Norfolk; Commander of Cruiser-Destroyer Group Five with additional duties as Commander U.S. Naval Forces Central Command Riyadh during Operations Desert Shield and Desert Storm, where he was in charge of Navy planning and participation in the air campaign. As Commander U.S. Third Fleet, he introduced joint training to the Pacific with the initiation of the first West Coast Joint Task Force Training Exercises (JTFEXs).

A leader in the introduction of cutting-edge information technology, he pioneered the use of information technology to mount large-scale operations using sea-based command and control. As Assistant for Strategy with the Chief of Naval Operations Executive Panel, and Program Planning Branch Head in the Navy Program Plan-

ning Directorate, he continued to hone his analytic skills resulting in designation as a specialist both in Operations Analysis and Financial Management. During his final tour of duty, he served as Deputy Chief of Naval Operations (Resources, Warfare Requirements and Assessments) in charge of Navy programs and budget.

Lautenbacher lives in Northern Virginia with his wife Susan who is a life-long high school and middle school science teacher.

DISCUSSION

Chairman LAMPSON. Thank you, Admiral. Let me start. We will go into our five-minute questions, and I will yield myself the first five minutes.

GOES-R BUDGET ESTIMATE

As you are well aware, the satellite procurement programs represent a significant portion of your agency's budget. GAO made the recommendation that the agency obtain independent cost estimates for these programs at the outset. You implemented this recommendation for GOES-R, and we believe that was the right decision. Are you now confident that the new estimate for GOES-R is realistic, and that the technical challenges are manageable?

Vice Admiral LAUTENBACHER. I believe that we have. It is always hard to say is this estimate going to be good until the end of the program, but we have created as good a change as we are ever going to get. We have had several independent looks at it. We created independent looks outside of the program office. We have had an independent review team come in with experts in the satellite acquisition and management community. We have worked through differences in the original estimates, which contractors provided during our risk-analysis part of the program, and we have gone to the point where the estimates are within four percent of each other. We believe that the \$7.7 billion that we have at this point is a very good estimate and well ahead of anywhere that we were in the NPOESS program, for instance, at this point of validity of the estimate.

Chairman LAMPSON. You made the decision to include an option for two additional satellites in the GOES-R series, restoring the program closer to the original plans. Obviously, exercising that option would raise the current estimates for the program. Did the independent cost estimation include an estimate for this, and what is NOAA's estimate for these two additional satellites?

Vice Admiral LAUTENBACHER. The independent cost estimate focused on the program of record, which we have submitted in our budget, which is a two-satellite program. We have some estimates of what the two additional options would cost, but they are not to the degree of confidence that we have in the first two that we have put together. But I believe that we have estimates that are pretty good at this point of what it might cost. Obviously, this depends on what the contractor will provide to us when they provide their initial bids.

Chairman LAMPSON. Do you have at least some kind of concept of what it would be, and is there going to be an opportunity to see, if we indeed do choose to go with the option, is it going to significantly lower the cost for all four in the event that that is what hap-

pens. Can you give me some kind of indication of what that might—

Vice Admiral LAUTENBACHER. Yes, sir, and we can provide that. We believe at this point that that is probably, at this point, the most cost-effective option for continuing service for geostationary satellites, but again, we need to make sure that we provide detailed cost-benefit analysis that convinces Congress as well as the Administration that this is the way to go.

Chairman LAMPSON. Do you have any kind of number preliminary—

Vice Admiral LAUTENBACHER. We do have numbers. I don't have—

Chairman LAMPSON. Okay.

Vice Admiral LAUTENBACHER.—here with me today, but we can provide them—

Chairman LAMPSON. If you would, do that.

Vice Admiral LAUTENBACHER.—of what we do know at this point.

Chairman LAMPSON. If you would do that, we would appreciate it.

Vice Admiral LAUTENBACHER. Yes, sir.

[The information follows:]

INFORMATION FOR THE RECORD

"The total ballpark estimate for contract options for two additional GOES-R series satellites is expected to fall between \$2.5 to \$3.0 billion dollars based on preliminary estimates."

THE VIIRS INSTRUMENT

Chairman LAMPSON. Can you please explain why, with the level of attention that has been focused on the VIIRS instrument? It is, once again, responsible for a delay in a launch of the NPOESS Preparatory Project, NPP, mission.

Vice Admiral LAUTENBACHER. The VIIRS instrument has been a technical challenge to build, and it has had, I would say, one problem after another. But each of those problems has been solved, so I have confidence that we are going to solve these problems. It has just taken more than the contractor had indicated it would take. We have put a schedule in place at this point that I believe gives them more than sufficient time. In fact, they say that they can beat the estimate that we are allowing them at this time by several months. They need to prove it to us, but essentially, towards the end of building this instrument. We are just about there, and I think that we can, you know, see the light at the end—we can see more than the light; we can see the end of the tunnel, so I have confidence that we are going to get there, but we are going to slug it out.

Chairman LAMPSON. What is the estimated date of the launch right now? Do you know that offhand, or—

Vice Admiral LAUTENBACHER. We are waiting for NASA to give us an estimate on it. We have added about eight months to the scheduled from the VIIRS instrument, and NASA will give an estimate of what it takes to put that on the NPP, but it will be delayed from 2009 to 2010. That we can say at this point.

Chairman LAMPSON. Okay, with the latest launch-schedule slip, does the NPP still have any value in its original mission, in providing a chance for exercising the new NPOESS instruments before they become operations, or is it now serving, primarily, as a gap-filler for the Earth observing instruments on NASA satellites?

Vice Admiral LAUTENBACHER. It will have use as a mitigation for risk reduction for the—it still has, remember—because the date of the NPOESS satellite is now 2013, so if we can't launch this in 2010 as we have suggested, it is still going to have value for risk reduction for NPOESS, and it is needed for continuity of the climate mission, as well as a gap-filler. It will fill all three purposes.

Chairman LAMPSON. Thank you, sir, and I will now recognize the Ranking Member, Mr. Inglis, for questions.

Mr. INGLIS. Thank you, Mr. Chairman.

FUNDS FOR THE HURRICANE SUPPLEMENTAL BUOYS

Admiral Lautenbacher, the President's fiscal year 2009 budget includes a request for tripling the funds for the hurricane supplemental buoys. How does this work? Described as a front line for hurricane forecasting, there are 15 of them——

Vice Admiral LAUTENBACHER. Yes, sir.

Mr. INGLIS. Does that bring them to 15?

Vice Admiral LAUTENBACHER. Yes, this brings it to 15. The money that we have asked for here will allow us to position the last three, and then provide the operating money. Last year, we were unable to get operating money for them, and we believe these need to be maintained. This needs to be a consistent observing system.

These buoys are in strategic positions out in the Atlantic and in the Gulf, and they provide an early-warning sentinel of precise information on wave heights, wind speeds, critical data that is needed to inform our models and ensure we understand where the hurricanes are going.

Mr. INGLIS. I guess the question, maybe you just answered it, is that you need money to operate them, because if they are going to 15, and there are three left to go out, that means the expense is in locating them. Is that why there is a significant increase?

Vice Admiral LAUTENBACHER. Most of the expense was in building them and locating them. The operating money is significantly less, but we, fortunately, thanks to Congress in helping us to get supplemental money several years ago to start this program of having warning sentinels on station, have been successful in doing that. As you say, 12 of the 15 are out there. This finishes the program and allows us to operate them, but they will require a small operating increment every year to keep them going.

Mr. INGLIS. How does that compare to the tsunami kind of buoys? Are they the same kind of concept?

Vice Admiral LAUTENBACHER. These are much different buoys than the tsunami buoys. First of all, these are very big, so they are large, more stable platforms. And in fact, during some of the hurricanes that we have had, these buoys have survived, so they are big. The DART buoys, as we call them, are really transmission buoys. They are small. They look a lot like the navigation buoys in the channel that you see. So they are small buoys. They are anchored

at the bottom of the ocean as well, and the instrumentation that is on them is basically to take an acoustic signal that comes from the ocean, translate it to an electronic signal, send it up to a satellite and back, so they are an intermediate transmitting point. That is the difference. The weather buoys have weather instrumentation on them as well as transmitting equipment.

THE TSUNAMI WARNING SYSTEM

Mr. INGLIS. You said, now, the tsunami warning system, when the big tsunami occurred several years ago, a lot of those were disabled or not functioning properly, right?

Vice Admiral LAUTENBACHER. We had six—well, first of all, they are up and down like any other equipment. They go down and they need to be maintained. We had six, what I would call experimental buoys, in the water at the time. Three of them were operating, and three weren't at the time of that. But that record could vary anywhere from three to six fully operational, so we repair them as schedules allow. And now we will have 35 of these.

Mr. INGLIS. That was my next question. So we have got 35. Is that in the budget request as well?

Vice Admiral LAUTENBACHER. Yes, sir, and we have doubled up on them, so in the areas of concern to our west coast, essentially, and the Aleutians, there are several spots that are doubled, so we are increasing the likelihood that we will have a complete array of buoys operational all year long. The problem being that in the Gulf of Alaska, you have to repair them in the spring and summer, because in the winter, it is virtually impossible to do the maintenance on them.

CORAL REEF WATCH PROGRAM

Mr. INGLIS. In a Science Committee CODEL recently was topped in Australia. I was tremendously impressed by the work you all are doing with the Coral Reef Watch Program. A very impressive foreign policy angle there that NOAA has with cooperating with the Australian government in creating goodwill for the U.S. as we help predict coral bleaching and things like that. I was very impressed at the work going on there.

Vice Admiral LAUTENBACHER. Thank you. It is important. We use the satellites to be able to warn for coral bleaching, and we have a strong partnership with the managers of the Great Barrier Reef Marine Park in Australia. Yes, it is a very important part of our international scene.

Mr. INGLIS. Yes, that became apparent when we were there. It is very impressive.

Thank you, Mr. Chairman.

Chairman LAMPSON. Thank you, Mr. Inglis, and I recognize Dr. David Wu for five minutes.

TSUNAMI EDUCATION AND MITIGATION FUNDING

Mr. WU. Thank you, Mr. Chairman. I now chair the Technology and Innovation Subcommittee, another Subcommittee of this Full Committee. In the prior incarnation of that Subcommittee, I served as Ranking Member, and we have jurisdiction, at that time, over

NOAA. It is an agency which I respect for the importance of its work, and you all handle a large number of very important tasks.

I have, today, an unfortunate duty, to refer back to a prior statute, which this committee, and the full Congress passed, which requires NOAA to spend 27 percent of certain tsunami monies on education on education and mitigation. That was a negotiated number, and some of us wanted a higher percentage on education and mitigation. Then-Chairman Boehlert prevailed upon all parties to settle on a 27 percent number, and as it has been said in business negotiations, it was a highly negotiated number. So those of us who were part of that negotiation place great store in spending that 27 percent in education and mitigation, and the reason why it has very important real-world significance is because while the ocean buoys are important and are important for warning in other parts of the world, we on the Oregon and Washington coast have a 250 subduction zone. The Cascadian fault is locked, and every 200 to 1,200 years, and on average, ever 300 years, we have a 9.0 to 9.5 earthquake off our coast, and there will be no warning. The hardware that you all have deployed around the oceans of the globe serve a very important purpose, but those buoys will provide no warning for a Cascadian subduction-zone earthquake. The only warning that will occur is the earthquake itself. Fifteen to thirty minutes later, the tsunami will roll ashore. The education money is the part of the program which would benefit the citizens of Oregon, Washington, and California, and provide a real service.

Now, Mr. Under Secretary, your agency had a clear statutory mandate to allocate 27 percent of these funds to education and mitigation. Can you explain why that number did not come to pass, and my understanding from the staff is that it is closer to 8.9 percent, rather than 27 percent actually being allocated to education and mitigation.

Vice Admiral LAUTENBACHER. Yes, sir. I think it is a little higher than that, but I don't want to argue about the percentage. Basically, we have had to sort of manage the conflicting requirements of getting a system set up and meeting the percentages, and it has not always worked out as well as we have liked, so as I have looked at it today, we have not met the percentage that is required in the law, and I would certainly agree with that, and we need to fix that. And I have been sworn to uphold the laws of the country, and I will do that. I was not aware of that particular issue until this morning.

But let me just tell you what we have done. First of all, the program itself is a great triumph. The President provided extra money. Congress, where we had zero, we now have \$23 million to produce awareness and a system, and we do have money going to mitigation and education. It is not the percentage, but we have allocated——

Mr. WU. Mr. Under Secretary, just to be clear, the \$23 million that you are referring to is for the entire tsunami-warning network, and it is 27 percent of that particular line item that we are talking about, and it is that 27 percent of that particular line item, the \$23 million that you all didn't hit. My understanding is that there is \$2.9-some-odd million for education, and at least the arithmetic on this side of the table shows that to be about 8.9 percent,

or thereabouts, and you are saying that that shouldn't have happened. And furthermore, you are saying that won't happen going forward.

Vice Admiral LAUTENBACHER. I am saying that I want to take a good look at this. I don't have enough information to sit here and promise the moon, so to speak. I will tell you our priority has been to try to get the system going first. We can't get the system—

Mr. WU. Mr. Under Secretary, with all due respect, there are times when you all have administrative discretion, but when it is a clear, statutory requirement—I mean this was negotiated in this committee, passed by the entire Congress, and this is not, you know, reading between the lines on Congressional intent. This is a very clear statutory requirement, and when I took our conversation to mean earlier was that I had a clear commitment that this would be fixed going forward.

Vice Admiral LAUTENBACHER. Yes, sir, this will be fixed going forward. I thought the question was on '08. I mean we are talking about what we are trying to do right now, at this—well, the budget has already passed. The year is half-gone, that sort of thing.

Mr. WU. Well, now that I have a commitment to going forward, when we come back—

Vice Admiral LAUTENBACHER. Yes, sir.

Mr. WU.—we can listen to you further about what might have happened in times back.

Vice Admiral LAUTENBACHER. And we have another option to provide money this year, too, from the frequency auction money. We believe that is coming in at the end of the—in a few months, and we will be able to use that for the education part. So we have two ways to work at this, sir.

Chairman LAMPSON. Thank you, Mr. Wu. Ms. Hooley, the gentlelady from Oregon, five minutes.

Ms. HOOLEY. Thank you very much, Mr. Chair, for allowing me to participate in this hearing today.

You might be surprised since both Representative Wu and I are from Oregon that my question might be very similar to him, but I have a question to ask you. Are you aware of the letter dated January 25 that the State Geologists from Oregon and Washington and Alaska and California sent to the Congressional delegates from the Pacific and Northwest Coastal States. Are you aware of that letter?

Vice Admiral LAUTENBACHER. I was not aware until about an hour before this hearing, so I would love to have it referred to me to help be able to work the problem.

Ms. HOOLEY. Okay, and I will make sure that you get a copy of that letter.

Vice Admiral LAUTENBACHER. Thank you.

Ms. HOOLEY. All right, and I just want to know, again, and I think I have already heard your commitment that you will fully fund what the statutory requirement is, which is 27 percent for the fiscal funds. Okay, another question is when were you planning on informing the State geologists of the plan to provide the States with their full 27 percent share? I had staff speak to our State geologists last Wednesday, and she wasn't aware of any funding plan

at this time. Can you—when do you expect to tell the State geologists what you are going to do?

Vice Admiral LAUTENBACHER. And I am not prepared to answer that today—

Ms. HOOLEY. Okay.

Vice Admiral LAUTENBACHER.—since I only saw this letter an hour before the hearing, and I would like to have an opportunity to—I understand the—I have read the letter, and there is a dispute on how this is being done in terms of consultation and who makes the decisions, and we will get together, and we will provide an answer that everybody will like.

Ms. HOOLEY. And sort of on the same line, and then I am going to get off on a different subject, because I think Representative Wu did a good job of asking and you answering the question. There is supposed to be a coordinating committee comprised of Federal, State, local, and tribal government agencies with some recommendations on this money. Are you aware of that, and are you going to use that coordinated committee, or do you know what is happening there, Admiral?

Vice Admiral LAUTENBACHER. I don't know why it is not working properly. I can tell from the letter that it is not working properly, and I will look into it personally, and the goal is to make it work in accordance with the legislation.

DISASTER RELIEF FOR FISHERIES

Ms. HOOLEY. Next in line is I am going to talk about fisheries, and by the way, thank you very much for—you were very helpful last year for our fisheries problem, and I appreciate that. In 2005, the commercial salmon fishing season was reduced by 60 percent due to the portion examined at the Klamath River. Again, several of us wrote to NOAA fisheries asking them to expedite the disaster-relief process so that a decision and a declaration could be made prior to the appropriation process. At first, there was no response, and then long after the disaster was made apparent, and then you stepped in and helped us out. It looks like this next year is going to be the worst year of all, so I am really concerned about how quickly we can get this process going, and again, it is important for us as we look at appropriations and putting a budget together, and I mean the Budget Committee is meeting tomorrow, I know, and I will be winding up its business in the next couple of months.

So can you assure us that knowing ahead of time that these are going to be some of the worse salmon runs of all, at least on the Oregon coast, the Southern Washington coast, and Northern California coast, that you can declare a disaster earlier and quicker than you have in the past so that people can be assure that they are going to get some kind of relief?

Vice Admiral LAUTENBACHER. We have—we are very well aware of the situation, and we have started work right now to get everyone together to ensure that the data can be produced and gotten to us as quickly as possible, and our goal is to try to, certainly, beat the record that we established two years ago, and do a much better job this year in terms of—

Ms. HOOLEY. Okay, because it took two years for the checks to get out the door.

Vice Admiral LAUTENBACHER. I understand. I have alerted the Administration, and I am prepared to work as hard as I can with the——

Ms. HOOLEY. Because the states have a lot of information already that I don't think it is necessary to gather that information again, and so I would hope that you would work closely with the states. Anything we can do to help expedite that process, let us know. We want to work with you to make that happen, an in a much more timely manner.

Vice Admiral LAUTENBACHER. I appreciate that, and I look forward to working with you, and we will do our best to meet the needs.

Ms. HOOLEY. Yes, just remember their mortgages. Their banks don't wait for two years for a house payment.

Again, thank you very much for allowing me to participate today, and thank you for answering my questions, and I am looking forward to working with you, both on the tsunami and the fisheries issues.

Vice Admiral LAUTENBACHER. Thank you.

Chairman LAMPSON. We have, actually, two series of votes that are coming up. We have two votes and then a ten-minute debate, and then two more votes following that. That will probably take an hour away from here. So let me quickly ask a couple of questions. We will be able to dismiss you, Admiral, but if the other in the second panel don't mind being patient and waiting for us, we will come back and get this done.

OCEAN SURFACE WINDS VECTOR AND QUIKSCAT

I see the budget includes a requested increase for ocean vector wind studies. How do these studies relate to the study that NASA was supposed to complete last month for options for replacing the data we now acquire with QuikSCAT, and given the long lead time for developing new operational satellites and instruments and the need to identify additional resources to finance the acquisition, what is the plan for obtaining these if QuikSCAT satellite fails?

Vice Admiral LAUTENBACHER. This is the issue of continuity of ocean surface winds vector. And first of all, let me say that the basic coverage for hurricane warnings is in our budget. I want to make sure people understand that we have covered the main satellites and the radars, the buoys and everything that provides hurricane warnings, so it is all there, and advances are made.

Now in terms of ocean surface winds vector, we have the study. It was just delivered. Right now, we are working through a cost-benefit analysis. We have been given some information from the JPL study, which works for NASA, but they worked for us in this case to produce that study. I have looked at it preliminarily, and I have asked people to get out to make a really detailed cost-benefit analysis and look at all of the options for ocean surface wind vector.

Now, we have two things in place. First of all, QuikSCAT is still operating. We have the ASCAT instrument, which is on Metop, and that will be operating up to 2020, so that system, while it is not perfect, neither is QuikSCAT. QuikSCAT is not what our people want. They want something better than QuikSCAT.

I have negotiated with the Indians, and we are looking at the Chinese as well. The Indians are going to launch a satellite with a scatterometer on board, so we have ways of getting that information. But in the meantime, we are going to be doing a cost-benefit analysis, to see whether this capability can be put on an airplane, whether you can put it on another satellite. Before we come and tell you that we need \$3 billion for a satellite, I want to be sure that we have every bit of information that can assure that we have taken the needs of the taxpayer and the cost of the system into place.

RULE CHANGES FOR RED SNAPPER FISHERIES

Chairman LAMPSON. Thanks. One final question: as you know, a number of my constituents are being impacted by the rule changes being implemented for the red snapper fisheries. There are apparently very different views on the current status of this fishery and real impact of the rules changes on maintaining its long-term viability. Is the agency planning to undertake new studies to reconcile or resolve some of these questions, and how is the information from fishermen in the area incorporated into the decisions about how to best manage the red snapper fishery?

Vice Admiral LAUTENBACHER. Obviously, we are going to continue what I would called detailed surveys to ensure that we monitor the stocks and the level stocks and the age and the distribution of the stocks to ensure that the rules that are in place make sense. That will be done continuously and in close cooperation with the Gulf Fishery Management Counsel.

We have asked for more money this year to help get better surveys from the recreational fish part of the industry, because that is an area of the industry that is not as detailed as the commercial side. So I believe that when that is in place, that will help us quite a bit to explain the rules that we have and why they are important.

And so we plan to have an all-out press in terms of—we also have money for cooperative research in here, which allows us to have fishermen do some of the research for us, to make sure that they feel part of the system for which they are subject for regulation, and that will be another critical part of the red snapper issue in the Gulf, which is a big one.

Chairman LAMPSON. Thank you very much. Mr. Inglis, you get the last word.

Mr. INGLIS. Thank you, Mr. Chairman.

NPOESS FUNDING

Admiral, last year, if I have got this right, for NPOESS, you didn't get an appropriation right, and so this year, it is a much larger request. It is \$74 million or something?

Vice Admiral LAUTENBACHER. That is for the climate sensors.

Mr. INGLIS. Climate sensors, yes.

Vice Admiral LAUTENBACHER. We didn't have—because we didn't have a plan. I hate to ask people for money before I have something I can justify. The White House got NASA and NOAA all together and worked together to have a plan. We have the plan, and

that is why we are asking for the \$74 million for the climate sensors. We believe we have a justifiable plan that will allow for continuity of the instruments and do it in the most cost effective way.

Mr. INGLIS. So it is just a matter that this year we have got the plan and we are ready to go, and that will make it—and does the \$74 million put you on track to accomplish what you hope to accomplish?

Vice Admiral LAUTENBACHER. The \$74 million, obviously, is a down payment, because we will have to continue the program, but that will get us started. We have a program, and we have an option for every one of the sensors that was taken off of NPOESS. These are the two that we have to do, right now, in one way or another. Actually, we have three. We put OMPS–Limb back on. I don't want to get too technical, but this is the beginning of what I would call a comprehensive program to make sure that all of the climate variables that we were unable to accommodate at first, because we need that NPOESS satellite up as quickly as possible. We are on track to do that. Seventy-four million dollars, we have to get started with this.

Mr. INGLIS. Got you. Thank you. Thank you, Mr. Chairman.

Chairman LAMPSON. Mr. Wu, follow up?

Mr. WU. Thank you very much, Mr. Chairman.

And at this point, I would like to submit for the record a written statement. And I would also like to, in addition to making the State geologist letter from Oregon, Washington, and the State of California available, as Ms. Hooley referred, to NOAA, I would also like to submit that letter to the hearing record.

Chairman LAMPSON. So ordered.

[The information follows:]



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Theodore R. Kulongoski, Governor

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January 25, 2008

The Honorable David Wu
2338 Rayburn HOB
Washington, DC 20515-3701

To: Congressional Delegates from Pacific and Northwest Coastal States

From: State Geologists from Pacific and Northwest Coastal States (Alaska, Washington, Oregon, and California)

Subject: Concerns from Pacific and Northwest Coastal States Geologists regarding the current administration of the National Tsunami Hazard Mitigation Program by NOAA/National Weather Service

Statement of the Problem

The Tsunami Warning and Education Act (P.L. 109-424) of 2006 instructs NOAA to invest 27% of annual appropriated funding to "conduct a community-based tsunami hazard mitigation program to improve tsunami preparedness of at-risk areas in the United States and its territories." In 2008 the 27% of appropriation equals \$6.26 M. It is the intent of the law to guarantee sufficient funding for Federal/State partnerships to continue in NOAA's Tsunami Program.

Furthermore, according to the Act a Coordination Committee composed of Federal, State, Local and Tribal representatives is charged with making funding recommendations on "how funds appropriated for carrying out the program under this section will be allocated."

Initial discussions with NOAA/NWS administrators indicate NOAA does not acknowledge these requirements and we are concerned that this will jeopardize the National Tsunami Hazard Mitigation Program (NTHMP), an ongoing Federal/State partnership upon which we rely to improve tsunami education, outreach and mitigation to protect life and property in U.S. coastal states, territories and commonwealths.

A comparison of the total NTHMP awards to the five Pacific States over the last three years demonstrates that NOAA/NWS is not following the instructions or the intentions of the Act. The states are experiencing a reduction in funds, not an increase as stated in the Act.

	FY 06	FY 07	FY 08
NWS Operations & Research:			
Local Warnings and Forecasts	\$591.38 M	\$616.49 M	\$637.91 M
Tsunami Program Appropriation	\$10.248 M	\$20.415 M	\$23.196 M
27% of Appropriation			\$6.26 M
What the 5 pacific states received	\$1.375 M	\$1.37 M	\$1.12 M

Requested Actions


On behalf of the Pacific States members of the NTHMP, we respectfully request your assistance to implement the following actions in response to our concerns.

- (1) We would like NOAA and the National Weather Service to identify the individuals responsible for administering the NTHMP. As active member States participating in the NTHMP, we think it is imperative that the decision process remains transparent and open.
- (2) We request that NOAA present an explanation of the entire Tsunami Program budget, the process by which budgetary decisions are made, and the rationale behind recent decisions to limit funds for the NTHMP to \$2.085 M, more than \$4 M below the amount specified by P.L. 109-424 given funding appropriated for FY08.
- (3) Under Section 5 of P.L. 109-424, NOAA is directed to establish a Coordination Committee comprised of representatives of Federal, State, local and tribal government agencies, to recommend how appropriated funds should be allocated to implement the NTHMP. We request NOAA confirm that final funding decisions will not be made until the Coordination Committee is fully functional and has reviewed the draft budgets, and made its recommendations for program funding.

This program is of utmost importance to all Pacific and Northwest coastal states where tsunami hazard is the greatest. The apparent erosion of Federal funding will severely hamper our abilities to produce evacuation maps for tsunamis, assist local communities with tsunami hazard mitigation projects, and continue tsunami hazard outreach and education vital to saving lives when tsunamis occur.

The following pages provide background information on the Tsunami Warning and Education Act and the National Tsunami Hazard Mitigation Program. Please do not hesitate to contact any of us for further clarification.

Respectfully submitted,



Robert Swenson
State Geologist
Alaska



Ron Teissere
State Geologist
Washington



Vicki S. McConnell
State Geologist
Oregon



John G. Parrish
State Geologist
California

Background

The National Tsunami Hazard Mitigation Program (NTHMP) was formed in 1997 based on the implementation plan and budget submitted to the U.S. Senate Appropriations Committee in 1996 by a Federal/State Steering Group comprised of three federal agencies – NOAA, FEMA and USGS – and the five Pacific States of Alaska, California, Hawaii, Oregon and Washington.

From its inception, the NTHMP has been made up of a 17-member State/Federal Steering Group that prepares and defends proposals to meet the objectives of the implementation plan. An 8-member State/Federal Executive Committee (also termed Steering Group) has held the responsibility for funding decisions, with one vote allotted to each of the five States and three Federal Agencies, with a ninth tie-breaking vote allocated to the Chairperson. During the past ten years, the NTHMP has been described as a model for State/Federal partnerships.

From 1998 – 2001 funding was provided at a level of \$2.3 M through the Congressional add-on process (earmarks) with the five Pacific states working together to garner support from their members in the U.S. House and Senate. Beginning in 2001, the NTHMP became a part of the NOAA baseline budget and the budget was increased to \$4.3 M, with the five member states receiving an annual program budget of \$275,000.

Following the 2004 Indian Ocean tsunami, the President signed into law the Emergency Supplemental Appropriations Act of 2005 increased operational funding for NOAA to \$24 M and the state participation expanded to include all Atlantic and Gulf Coast States, island territories and commonwealths.

This legislation was supported by the Governors of Washington, Oregon, California, Alaska, and Hawaii with a letter jointly signed by each. Among the considerations and recommendations contained in the letter were: 1) Full State participation in the NTHMP Steering Group; and, 2) Improved coordination between the Federal and State members of the NTHMP Steering Group.

Discussion of Our Concerns

Despite passage of the 2006 Tsunami Warning and Education Act, which authorized the NTHMP under the administration of NOAA/National Weather Service, historic funding levels for Pacific states have significantly declined due to the interpretation of the law by NOAA. Section 5 (a) of P. L. 109.424 calls for the NTHMP to be a, “community-based tsunami hazard mitigation program to improve tsunami preparedness of at-risk areas in the United States,” and authorized under Section 8, that “not less than 27% of the amount appropriated shall be for the (NTHMP).”

The NOAA/NWS administration of the NOAA Tsunami Program, which includes NTHMP, has conducted a closed process on decisions regarding state funding levels, appointments of the NTHMP Chair, business decisions at national meetings, and a general lack of transparency and accountability for how these decisions are being made. Most recently at the FY ‘08 NTHMP annual meeting, the state members were informed that NOAA/NWS will not adhere to the statutorily prescribed 27% appropriation for NTHMP (which is \$6.26 M for FY ‘08) and continues to hold that the NTHMP will only

make recommendations to NOAA for state/federal proposals using a much lower budget level of \$2.085 M. This lower budget amount now includes over 20 coastal jurisdictions from the Pacific, the Atlantic and Gulf coasts.

Of primary concern is the apparent conflict between NOAA's interpretation of P.L. 109-424 and the original intent of HR 1674 (House Science Committee bill) that provided the basis for the National Tsunami Warning and Education Act of 2006. The following excerpts clearly convey the expectations of the Committee:

- "The Committee expects NOAA to use the National Tsunami Hazard Mitigation Program as the foundation of its education and outreach activities."
- To implement the NTHMP, NOAA will establish, "a coordinating committee of Federal and state officials, which shall develop a plan for ensuring wide participation in the program; determine how funds will be allocated;"
- "To ensure that NOAA strikes a better balance in implementing the Act, the Committee prescribes a percentage of any amounts appropriated for each component of the program and expects NOAA to follow the percentages."

Since its establishment in 1997, the NTHMP Steering Group has been responsible for implementing the program and making funding decisions. Among several precedents that specify the role of the Steering Group in making funding decisions and recommendations, the 1996 *Tsunami Hazard Mitigation Implementation Plan —A Report to the Senate Appropriations Committee* states that:

"The (Senate Appropriations) Committee directs the federal/state working group to formulate a budget to implement the tsunami hazard mitigation action plan."

In *The U.S. National Tsunami Hazard Mitigation Program Summary*, Eddie Bernard summarized the history of the program and the role of the Steering Group in the budget process as follows:

"1. Background These recommendations have been carried out over the past 5 years under the guidance of the Federal/State National Hazard Mitigation Program Steering Group. The Steering Group met twice each year to report progress on the five elements, **to make funding decisions**, and to make adjustments to the Program (p.10)."

The language in these documents and others identifies funding decisions as one of the fundamental historical roles of the NTHMP Steering Group. Our concern is that NOAA now interprets the role of the Coordination Committee defined in P.L. 109-424 as something distinctly different from that of the Steering Group, which governed the activities of the NTHMP prior to 2006. If this is the case, then the joint recommendations made by the Governors of the five Pacific States have not been implemented. The implications of such a policy change dramatically challenge state and local efforts to successfully mitigate tsunami risks.

FIXING FISCAL YEAR 2008 BUDGET ALLOCATIONS

Mr. WU. Mr. Under Secretary, I find it a matter of relief that you and NOAA are committed to making this appropriate split going forward, the statutorily required 27 percent for mitigation and education and other purposes, as specified in the statute that we passed in 2006.

I do want to point out to you that in the Administration fiscal year 2009 request—this is going forward now—if—even when we back out any funds for the deployment of new buoys, the National Tsunami Mitigation Program, the program that we specified at 27 percent of this overall line item, it is slated to be at less than half the statutorily mandated amount, and I just wanted to point that out to you in the forward-going fiscal year 2009 budget request.

Now, the Congress appropriates this money as one unified line item, and in the last fiscal year, it was \$23 million. But I just want to very clearly point out that there is a very clear statutory mandate that 27 percent be spent on the National Tsunami Mitigation Program, and that we seem to have at the least the beginnings of a problem going forward into fiscal year 2009, and I want to point that out to you and permit you to address any issues you can in fixing fiscal year 2008 or before, and also anything further you want to say about fiscal year 2009.

Vice Admiral LAUTENBACHER. And we will, obviously, have a better chance of fixing 2009 than I do of fixing 2008, but I am committed to fixing both to the best of my ability.

Mr. WU. I just want to point out again, best of one's ability is not the criterion of success. This is a statutory requirement, and this is a black-letter law requirement.

Vice Admiral LAUTENBACHER. I understand what you are saying. Let me just say for one—it is very difficult to take the requirements of a program and deliver something that actually does what it is supposed to do, and over here have something that, well, five percent has to go there. 27 percent has to go there. Sometimes those don't quite match. But I understand the 27 percent, and obviously if appropriations and Congress want the 27 percent, they are getting 27 percent.

Mr. WU. None of these decisions, yours or ours, are easy, and that is why the taxpayers sent us here, to deal with some of these very difficult issues, and I prefer the first two words of your answer. Thank you very much, Mr. Under Secretary. Thank you for being here.

Vice Admiral LAUTENBACHER. Thank you, Mr. Wu.

Chairman LAMPSON. Thank you very much, Mr. Under Secretary. This hearing will standing in recess pending the votes. Thank you very much.

[Recess.]

Chairman LAMPSON. The Subcommittee on Energy and the Environment is back into session, and I want to welcome our second panel of witnesses. And thank you very much for your patience. Sorry that we had that interruption.

Mr. David Powner is Director of Information Technology Management Issues at the Government Accountability Office. Dr. Jack Hayes is the Assistant Demonstrator for the National Weather

Service at the National Atmospheric Administration. Mr. Eugene Juba is Senior Vice President for Finance of the Air Traffic Organization at the Federal Aviation Administration. We welcome you, gentlemen, and you each have five minutes to present your spoken testimony. Your written testimony will be included in the record for the hearing, and when you have made all of your testimonies, we will begin with questions, and each Member will have five minutes to question the panel.

Mr. Powner, you may begin.

Panel II

STATEMENT OF MR. DAVID A. POWNER, DIRECTOR, INFORMATION TECHNOLOGY MANAGEMENT ISSUES, U.S. GOVERNMENT ACCOUNTABILITY OFFICE (GAO)

Mr. POWNER. Thank you, Chairman Lampson and Ranking Member Inglis. We appreciate the opportunity to testify this afternoon on our report on aviation and weather services completed at your request.

The National Weather Service supports the Federal Aviation Administration by providing aviation-related forecasts and warnings at air traffic control and route centers across the country. These forecasts and warnings include information on thunderstorms, air turbulence and icing. These services are provided through an inter-agency agreement that FAA reimburses NWS approximately \$12 million annually. As requested, I will summarize our findings and recommendations from our report being released today. Specifically, I will discuss FAA's recent efforts to explore options for enhancing these services, FAA's efforts to convey to NWS its needs, both agencies efforts to ensure quality and measure performance, and our recommendations for improvements.

First, FAA has found, through multiple studies over the past several years, that the services provided to them are inconsistent, non-standardized, and that collaboration between the two agencies has been poor. Given this, FAA has asked NWS to explore options to restructure how it provides services and to reduce the number of locations that provide them. Clearly, FAA is interested in more consistent and improved services and has threatened to use private-sector firms and government-funded laboratories instead of NWS if such services could be provided at lower costs. NWS, in response to FAA, has conducted prototypes, demonstrating that remote operations are possible and effective, but difficult due to cultural and technological challenges. In April of last year, these exploratory improvement efforts were put on hold while FAA decided to better define the services it wants from NWS. In December, at the conclusion of our review, FAA delivered a comprehensive set of requirements that reiterate existing requirements like daily briefings and weather advisories and provide new ones like on-demand and new forecasting products. NWS is currently responding to this set of requirements.

Turning to quality and performance measurement, our findings here are surprising. While interagency agreements state that both NWS and FAA have responsibility for assuring and controlling the quality of aviation weather observations, neither does so consist-

ently. Specifically, neither NWS or FAA has developed performance measures and metrics, evaluated performance and made improvements. Although some evaluations of services are done anecdotally and rated on a rough, zero-to-four scale, quantitative and objective performance measures, such as timeliness, accuracy and false-alarm rates do not exist. I say this is surprising because NWS is one of the better federal agencies when it comes to performance measurement, but NWS does not measure performance for weather products and services provided at en route centers.

We, therefore, made recommendations to both the Secretaries of Commerce and Transportation to direct the head of the Weather Service and FAA to develop performance measures and metrics, conduct evaluations of performance and take the necessary action to improve performance. The set of requirements that FAA delivered in December have begun to define some of these performance measures, but additional work is needed here, and baselines will need to be established to measure performance.

Mr. Chairman and Ranking Member Inglis, before summarizing, I would like to thank you for your oversight of this important issue. Your inquiry into this has resulted in FAA better defining its needs from NWS to accomplish its mission, improvements in executive-level dialogue between FAA and NWS, and it has highlighted a critical area in our government that has not been effectively measured and improved, despite this arrangement being in operation for over 25 years. Going forward, it is essential that FAA and NWS work collaboratively to work on future requirements, aggressively work to address them, agree on an operational model and a reasonable transition timeline, develop additional performance measures, establish baselines to measure performance, and aggressively measure and make improvements so that FAA has the information it needs to effectively manage air traffic.

Mr. Chairman, this concludes my statement. I would be pleased to respond to questions.

[The prepared statement of Mr. Powner follows:]

PREPARED STATEMENT OF DAVID A. POWNER

Aviation Weather: Services at Key Aviation Facilities Lack Performance Measures, But Improvement Efforts Are Under Way

Abstract

Although interagency agreements between the National Weather Service (NWS) and the Federal Aviation Administration (FAA) state that both agencies have responsibilities for assuring and controlling the quality of aviation weather observations, neither agency consistently does so for weather products and services produced at the en route centers. In its report being issued today, GAO is making recommendations to the Secretaries of Commerce and Transportation to ensure that NWS and FAA develop performance measures, evaluate the services against those measures, and provide feedback to NWS. FAA has begun to address GAO's recommendations. In late December 2007, FAA released new requirements for the aviation weather services provided at en route centers. These requirements included performance measures and methods for evaluating performance and providing feedback to NWS. FAA directed NWS to respond by May 2008 and include plans in its response for three operational concepts—in its existing configuration located at the 21 en route centers, through remote services provided by a reduced number of regional facilities, and through remote services provided by a single centralized facility. FAA stated that NWS should assume a transition time of 90 days for the exist-

ing configuration, 180 days for regionalized services, and one year for a single facility. NWS plans to respond to FAA by the May 2008 deadline, but FAA's estimated time frames for transitioning to a new operational concept may be overly ambitious. Given the importance of accurate and timely weather information in air traffic control, it will be important for NWS to conduct a thorough evaluation before it transitions to a new operational concept in order to ensure that there are no impacts on the continuity of air traffic operations and no degradation of weather service.

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to participate in today's hearing to discuss our work on the National Weather Service's (NWS) aviation weather services. NWS is responsible for providing storm and flood warnings and weather forecasts for the United States, its territories, and adjacent oceans and waters. NWS's weather products are also a vital component of the Federal Aviation Administration's (FAA) air traffic control program, providing weather information to local, regional, and national air traffic management, navigation, and surveillance systems. NWS aviation weather products include forecasts and warnings of meteorological conditions that could affect air traffic, including thunderstorms, air turbulence, and icing. In addition to providing aviation weather products developed at its own facilities, NWS also provides staff on-site at each of FAA's en route centers—the facilities responsible for controlling high-altitude air traffic outside the tower and terminal areas.

Over the last few years, FAA has been exploring options for enhancing the efficiency of the aviation weather services provided at its en route centers. In September 2005, the agency asked NWS to restructure its services to be more efficient; in response, NWS conducted a prototype and proposed restructuring its offices to provide services remotely. FAA declined this proposal in favor of making its existing requirements more precise. In late December 2007, FAA delivered its revised requirements to NWS to improve these services.

As requested, our testimony summarizes our report being released today on NWS's aviation weather services¹ and provides an update on recent efforts to develop aviation weather requirements and performance measures. Specifically, we discuss both agencies' efforts to ensure the consistency and quality of these services, our recommendations to improve these services, FAA's recent efforts to establish requirements and performance measures, and NWS's plans for responding to these requirements.

The information in this statement is based largely on our work supporting the report being released today. In addition, to provide an update on the agencies' recent efforts, we reviewed key documents completed in December 2007, including a new interagency agreement, FAA's requirements, and the accompanying quality assurance plan. We compared NWS's tentative next steps with best practices for validating requirements and interviewed the NWS official responsible for responding to the new requirements. We conducted our work on the report and testimony between May 2007 and February 2008, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Additional details on our objectives, scope, and methodology are provided in Appendix I.

Results in Brief

Although interagency agreements between NWS and FAA state that both agencies have responsibilities for assuring and controlling the quality of aviation weather observations, neither agency consistently does so for weather products and services produced at the en route centers. Specifically, neither has implemented performance measures and metrics, regularly evaluated weather service unit performance, or provided feedback to improve these aviation weather products and services. Because of this lack of performance tracking and oversight, NWS cannot demonstrate the quality or value of its services, and FAA cannot ensure the quality of the services it funds. Until both agencies are able to measure and ensure the quality of the aviation weather products and services at the en route centers, FAA may not be getting the information it needs to effectively manage air traffic.

¹GAO, *Aviation Weather: FAA Is Re-evaluating Services at Key Centers; Both FAA and the National Weather Service Need to Better Ensure Product Quality*, GAO-08-258 (Washington, D.C.: Jan. 11, 2008).

In our report being released today, we are making recommendations to the Secretaries of Commerce and Transportation to ensure that NWS and FAA develop performance measures for aviation weather services provided at en route centers, evaluate the services against those measures, and provide feedback to the NWS staff on how to improve services. The Secretary of Commerce agreed with our recommendations and stated that the National Oceanic and Atmospheric Administration (NOAA) would work with FAA to develop methods for performance monitoring and evaluation. The Department of Transportation did not agree or disagree with our recommendations, but stated that FAA's revised requirements would establish performance measures and evaluation procedures, and that FAA would negotiate with NWS to implement them.

FAA has already begun to address the recommendations noted in our report; specifically, in late December 2007, FAA finalized its new aviation weather requirements, which include proposed performance measures and methods for evaluation. In its requirements, FAA provides NWS with an overall vision for aviation weather services that are performance-based, standardized, continuous, and have a national scope. FAA reiterates its need for existing products and services (such as twice-daily briefings), provides revisions to some existing requirements, and defines a new graphical forecast product for terminal radar approach control facilities. In addition, FAA identifies performance measures—such as customer satisfaction and forecast accuracy—and processes for evaluating performance and providing feedback to NWS. FAA expects NWS to respond as to whether it is able to meet the requirements by early May 2008, and has directed NWS to include plans for three operational concepts to fulfill the requirements—in its existing configuration located at the 21 en route centers, through remote services provided by a reduced number of regional facilities, and through remote services provided by a single centralized facility. FAA plans to select one of the operational concepts and NWS will immediately begin to transition to the new concept. FAA required that NWS assume a transition time of 90 days if it selects the existing configuration, 180 days if it selects the regionalized remote services concept, and one year if it selects the single facility concept.

NWS plans to respond to FAA by the May 2008 deadline, but FAA's estimated time frames for providing the revised services may be overly ambitious. NWS created a team to analyze FAA's requirements and to develop a response package for all three operational concepts. The NWS official responsible for aviation services reported that the agency is on track to respond by FAA's deadline of May 2008. However, FAA's estimated time frames for transitioning to a new operational concept may be overly ambitious. Given the importance of accurate and timely weather information in air traffic control, it will be important for NWS to conduct a thorough evaluation before it transitions to a new operational concept in order to ensure that there are no impacts on the continuity of air traffic operations and no degradation of weather service.

Background

FAA is responsible for ensuring safe, orderly, and efficient air travel in the national airspace system. NWS supports FAA by providing aviation-related forecasts and warnings at air traffic facilities across the country. Among other support and services, NWS provides four meteorologists at each of FAA's 21 en route centers to provide on-site aviation weather services. This arrangement is defined and funded under an interagency agreement.

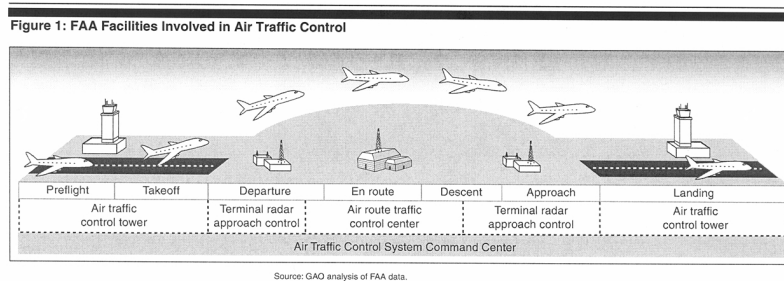
FAA's Mission and Organizational Structure

FAA's primary mission is to ensure safe, orderly, and efficient air travel in the national airspace system. The agency's ability to fulfill its mission depends on the adequacy and reliability of its air traffic control systems, as well as weather forecasts made available by NWS and automated systems. These resources reside at, or are associated with, several types of facilities: air traffic control towers, terminal radar approach control facilities, air route traffic control centers (en route centers), and the Air Traffic Control System Command Center. The number and functions of these facilities are as follows:

- 517 air traffic control towers manage and control the airspace within about five miles of an airport. They control departures and landings, as well as ground operations on airport taxiways and runways.
- 170 terminal radar approach control facilities provide air traffic control services for airspace within approximately 40 miles of an airport and generally up to 10,000 feet above the airport, where en route centers' control begins. Terminal controllers establish and maintain the sequence and separation of aircraft.

- 21 en route centers control planes over the United States—in transit and during approaches to some airports. Each center handles a different region of airspace. En route centers operate the computer suite that processes radar surveillance and flight planning data, reformats them for presentation purposes, and sends them to display equipment that is used by controllers to track aircraft. The centers control the switching of voice communications between aircraft and the center, as well as between the center and other air traffic control facilities. Two en route centers also control air traffic over the oceans.
- The Air Traffic Control System Command Center manages the flow of air traffic within the United States. This facility regulates air traffic when weather, equipment, runway closures, or other conditions place stress on the national airspace system. In these instances, traffic management specialists at the command center take action to modify traffic demands in order to keep traffic within system capacity.

See Figure 1 for a visual summary of the facilities that control and manage air traffic over the United States.



NWS's Mission and Organizational Structure

The mission of NWS—an agency within the Department of Commerce's NOAA—is to provide weather, water, and climate forecasts and warnings for the United States, its territories, and its adjacent waters and oceans to protect life and property and to enhance the national economy. In addition, NWS is the official source of aviation- and marine-related weather forecasts and warnings, as well as warnings about life-threatening weather situations.

The coordinated activities of weather facilities throughout the United States allow NWS to deliver a broad spectrum of climate, weather, water, and space weather services in support of its mission. These facilities include 122 weather forecast offices located across the country that provide a wide variety of weather, water, and climate services for their local county warning areas, including advisories, warnings, and forecasts; nine national prediction centers² that provide nationwide computer modeling to all NWS field offices; and 21 center weather service units that are located at FAA en route centers across the Nation and provide meteorological support to air traffic controllers.

NWS Provides Aviation Weather Services to FAA

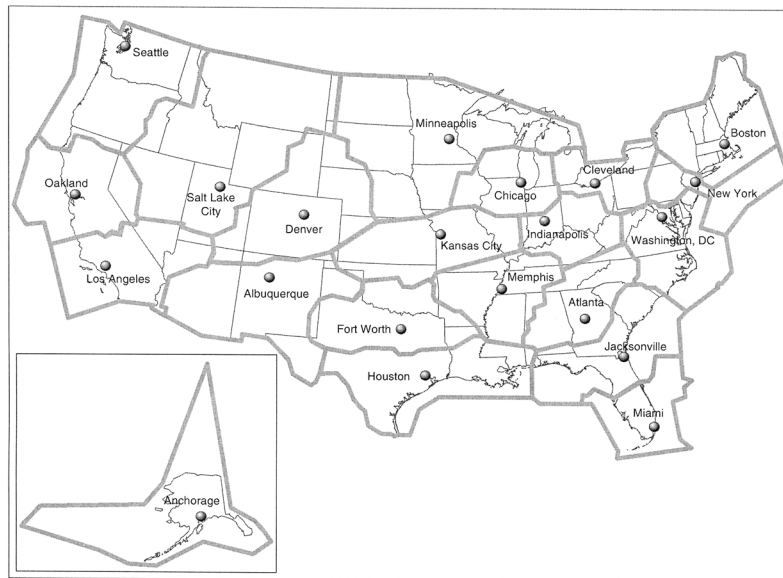
As an official source of aviation weather forecasts and warnings, several NWS facilities provide aviation weather products and services to the FAA and aviation sector. These facilities include the aviation weather center, weather forecast offices located across the country, and center weather service units located at FAA en route centers. See Table 1.

²These centers include the National Centers for Environmental Prediction Central Operations, Aviation Weather Center, Environmental Modeling Center, Hydrometeorological Prediction Center, Ocean Prediction Center, Storm Prediction Center, Tropical Prediction Center/National Hurricane Center, Climate Prediction Center, and Space Environment Center.

Table 1: NWS Offices That Provide Aviation Weather Products and Services to FAA

Office	Description
Aviation weather center	The aviation weather center, located in Kansas City, Missouri, issues warnings, forecasts, and analyses of hazardous weather for aviation. Staffed by 65 personnel, the center develops warnings of hazardous weather for aircraft in flight and forecasts of weather conditions for the next 2 days that could affect both domestic and international aviation. The center also leads a collaborative effort to develop a forecast of expected convective events for the entire country every 2 hours. This is used by FAA to manage aviation traffic flow across the country.
Weather forecast offices	NWS's 122 weather forecast offices issue terminal area forecasts for approximately 625 locations every 6 hours or when conditions change. Those forecasts consist of the expected weather conditions significant to a given airport or terminal and are primarily used by commercial and general aviation pilots.
Center weather service units	NWS's center weather service units are located at each of FAA's 21 en route centers and operate 16 hours a day, 7 days a week (see fig. 2). Each weather service unit usually consists of three meteorologists and a meteorologist-in-charge who provide strategic advice and aviation weather forecasts to FAA traffic management personnel. Governed by an interagency agreement, FAA currently reimburses NWS approximately \$12 million annually for this support.

Source: GAO analysis of NWS and FAA data.

Figure 2: Center Weather Service Unit Locations and Service Areas

Sources: NWS (data); Map Resources (map).

Center Weather Service Units: An Overview of Current Requirements

FAA's existing requirements for the center weather service units are broadly outlined in an interagency agreement that is updated every few years. The interagency agreement specifies that NWS is to provide meteorological advice and consultation to en route center operations personnel and other designated FAA air traffic facilities within the en route area of responsibility. This agreement establishes specific terms that govern the number of NWS staff, their working hours, and cost reimbursement details. It does not specify the contents, quality, or frequency of weather products.

An NWS directive, signed in May 2006 and intended for NWS's weather forecast offices and center weather service units, provides more specific information regarding the content of weather products and services, including center weather advisories, daily briefings, on-demand consultations, and meteorological impact statements. These products and services are described in Table 2. In addition, center weather service unit meteorologists can provide input every two hours to the Aviation Weather Center's creation of the Collaborative Convective Forecast Prod-

uct; train FAA personnel on how to interpret weather information; and, if warranted, provide weather briefings to nearby terminal radar approach control facilities.

Table 2: Key Products and Services Currently Provided by Center Weather Service Units

Product or service	Description
Center weather advisory	A short-term, unscheduled warning of hazardous weather conditions used primarily by air crews to anticipate and avoid adverse weather conditions in the en route and terminal environments. It describes current weather conditions or adverse weather conditions—such as moderate to severe icing or turbulence, thunderstorms, and low ceilings and visibility—beginning within the next 2 hours.
Briefings	Short updates provided by en route center meteorologists to FAA supervisors twice a day; they include current weather advisories, a summary of the predicted weather in the en route area, terminal forecasts, and jet stream and freezing information.
On-demand consultation	Unscheduled verbal presentations provided to traffic management controllers, supervisors, and other FAA facilities within the en route center area. Consultations may be about the expected weather conditions or interpretations of weather information from the satellite images.
Meteorological impact statement	An unscheduled forecast of weather conditions that are expected to adversely impact the flow of air traffic in the en route center's area of responsibility within 4 to 12 hours. These statements detail weather conditions expected to adversely impact air traffic flow in the service unit area of responsibility and should include the location, height, extent, and movement of the weather conditions.

Source: GAO analysis of FAA and NWS data.

FAA Sought to Improve Aviation Weather Services Provided at En Route Centers

In recent years, FAA has sought to assess and improve the performance of the center weather service units.³ For example, FAA performed multiple studies on the current services provided by the center weather service units that noted the lack of standardization of products and services. In addition, FAA conducted a study to determine if remote operations were feasible, and requested that NWS restructure its aviation weather services to provide improved services more efficiently. In response to this request, NWS conducted a prototype of remote operations in which center weather service unit products and services were prepared by the closest weather forecast office. NWS proposed expanding this prototype to FAA, but the agency declined this proposal. Instead, FAA stated that it would redefine its requirements for the functions provided by center weather service units. Table 3 provides more information about the agency's assessment and improvement efforts.

³FAA is also involved in a longer-term initiative to increase the efficiency of the national air-space system and to improve its overall safety. This initiative, called the Next Generation Air Transportation System, is a joint effort of the Department of Transportation, the National Aeronautics and Space Administration, the White House Office of Science and Technology Policy, and the Departments of Homeland Security, Defense, and Commerce. FAA anticipates that this initiative may lead to major changes in the aviation weather program that would supersede its current efforts.

Table 3: Recent Assessment and Improvement Efforts by FAA and NWS

Time frame	Activity
November 2003	FAA performed a functional audit of center weather service units and found that the services provided at different en route locations were inconsistent, the products were not standardized, and there was little communication and collaboration between neighboring service units.
September 2005	FAA requested that NWS restructure its aviation weather services to provide improved services more efficiently.
January 2006	FAA initiated an analysis of the value of different activities performed by the center weather service units. Similar to the 2003 study, the results of this analysis noted the lack of standardization of products, services, tools, and procedures. In addition, the report found that quality assurance was provided on an informal basis, there was no formal feedback process for products and services, and meteorological training was not standardized.
August 2006	NWS conducted a prototype in which center weather service unit products and services were completed and delivered remotely from the closest weather forecast office. This prototype showed that remote operations were possible and effective, but that they would be difficult to implement because of the need for cultural change, technology upgrades, and communication stability. Specifically, forecasters in the prototype were not able to provide dedicated support for the aviation mission because their other duties—including forecasting severe weather at the weather forecast office—took precedence. In addition, a collaboration technology used during the prototype was not operationally ready to use, servers were unstable, critical radar data were inconsistent with weather forecast office data, and communications lines were unstable throughout the prototype.
September 2006	An FAA study confirmed that it is possible to deliver weather information, products, and services from one or many remote locations with currently available state-of-the-art technology platforms.
October 2006	FAA administered a market survey to determine whether the private sector could provide remote weather services at a lower cost than currently provided. Ten organizations, including private sector firms and government-funded laboratories, responded that they could provide the services that FAA wanted. NWS presented its proposal for restructuring its aviation weather services to FAA. In this proposal, NWS suggested moving meteorologists from the en route centers to weather forecast offices, and providing remote aviation weather services from the weather forecast offices.
April 2007	FAA declined NWS's proposal. Instead, FAA reported that it would redefine its requirements for the functions provided by the center weather service units.

Source: GAO analysis of NWS and FAA data.

FAA Found Its Requirements Were Not Sufficiently Precise and Worked to Develop New Ones

When FAA declined NWS's proposal for restructured aviation weather services, it did so in part because it considered its existing requirements governing NWS's center weather service units to be too broad to ensure the efficiency and cost-effectiveness of the services. FAA then worked for several months to redefine these requirements. In April 2007, FAA's Air Traffic Organization began refining its requirements for aviation weather services at the en route centers. To do this, FAA collected relevant NWS and FAA orders and directives and developed a list of over 100 products and services that the different service units provide. FAA then sent this list to traffic managers in each of the en route centers, asking them to specify the products and services that they need, the ones they do not need, and any new products or services that they would like. Traffic managers were also able to determine if they would want some of the more customized weather products that are currently available at selected en route centers. Using results from this survey, FAA developed a revised list of requirements and performance measures, which it provided to NWS in late December 2007.

Neither NWS nor FAA Currently Ensures the Quality of Aviation Weather Services at En Route Centers

While interagency agreements between NWS and FAA state that both agencies have responsibilities for assuring and controlling the quality of aviation weather observations, neither NWS nor FAA consistently does so for weather products produced at the en route centers. Leading organizations use quality assurance to provide staff and management with objective insights into processes and associated work products.⁴ Generally, quality assurance includes objectively evaluating performed processes, work products, and services against applicable process descriptions, standards, and procedures; identifying and documenting noncompliance issues; providing feedback to project staff and managers on the results of quality assurance activities; and ensuring that noncompliance issues are addressed. However, neither NWS nor FAA has developed and implemented performance measures

⁴ The Carnegie Mellon University's Software Engineering Institute is recognized for its expertise in software and system processes. See Carnegie Mellon University Software Engineering Institute, *Capability Maturity Model® Integration for Development Version 1.2* (Pittsburgh, PA: August 2006).

and metrics, regularly evaluated weather service unit performance, or provided feedback to improve these aviation weather products and services.

Because of this lack of performance tracking and oversight, NWS cannot demonstrate the quality or value of its services, and FAA cannot ensure the value of the services it funds. As a result, it is not clear that FAA is getting the information it needs to effectively manage air travel. FAA officials stated that they intend to establish performance measures for their redefined requirements and to improve their oversight against these measures. However, FAA has not worked with NWS to define a comprehensive set of measures for its requirements, and it is unclear how the agency would develop a performance baseline for comparison to actual performance because many of the products and services have not previously been measured.

NWS Does Not Measure or Evaluate Aviation Weather Products and Services at En Route Centers

NWS does not measure or evaluate the aviation weather services it provides at en route centers. Under existing interagency agreements, NWS is responsible for controlling the quality of its aviation weather observations. Specifically, the agency is responsible for monitoring and evaluating the quality and effectiveness of its aviation weather services, including the services provided at the weather forecast offices, the Aviation Weather Center, and the en route centers.

While NWS has developed and continues to monitor performance measures for aviation weather forecasts provided by its weather forecast offices and the Aviation Weather Center, the agency has not done so for the weather products and services provided at the en route centers. Specifically, NWS has not developed performance measures for aviation weather products and services at en route centers, evaluated the aviation weather products and services developed at the en route centers, or provided feedback for those services. NOAA and NWS officials declined to explain why the agency does not have performance measures for aviation weather products or services at en route centers, but they noted that neither FAA nor NWS has required or funded such an effort. Further, the aviation services branch chief told us that he had planned to begin evaluations for weather unit services at the en route centers but decided to wait because of the potential for large-scale changes to the services.

Until NWS establishes performance measures and evaluates the quality and effectiveness of its products against these measures, the agency will remain unable to ensure that it provides consistent quality products and to effectively demonstrate the value it provides to FAA.

FAA Does Not Consistently Evaluate or Provide Feedback on Aviation Weather Services at En Route Centers

FAA has not consistently evaluated NWS services at its en route centers or adequately provided feedback on the results of its few evaluations. Under interagency agreements, FAA is responsible for ensuring that aviation weather services meet its requirements. In addition, it requires the traffic management officer within each traffic management unit to evaluate the aviation weather services at the en route centers annually and to provide feedback to the resident meteorologist-in-charge.

FAA has not consistently ensured the quality of aviation weather services at en route centers. Specifically, it currently does not have any quantitative and objective performance measures—such as timeliness, accuracy, or false alarm rate—by which to evaluate these services. Agreements between the agencies broadly specify the types of aviation weather products to be developed at the en route centers but do not provide criteria by which these products can be evaluated. In addition, FAA has not consistently performed its annual evaluations of these products and services. According to the contracting officer's technical representative responsible for the evaluations, the last evaluation was performed in 2006, and its results were largely anecdotal. Specifically, the evaluation called for the traffic management officer to rate the weather unit on a scale of 0 to 4 in different categories, including quality and timeliness of products and services, knowledge of air traffic control, and participation in training. The technical representative could not find any evaluations in 2005, evaluations of only three service units in 2004, and evaluations of a similarly small number of service units in 2003.

Further, FAA is not consistently providing feedback to weather staff at the en route centers. According to the technical representative, the evaluations from 2006 were not compiled or analyzed because the evaluations contained no glaring problems or issues that needed additional attention. In addition, the NWS aviation services chief told us that FAA had sent him copies of the evaluations from 2006 but did not offer analysis of these evaluations, express concerns about the services, or

send the results to the individual center weather service units. This official also stated that he was not aware that FAA had performed any annual evaluations of the center weather service units prior to 2006.

Because FAA has not established performance requirements or consistently and thoroughly evaluated the aviation weather services at en route centers, the agency cannot be sure that the products and services provided by the weather unit meteorologists are adding value, and it cannot provide feedback to NWS meteorologists in order to improve the services. To address this shortfall, FAA officials stated that they intend to establish performance measures for aviation weather services at en route centers when they revise their requirements and to improve their oversight of NWS against these measures. However, FAA has not worked with NWS to develop measures for the products and services it will require from NWS, and it is unclear how the agency would develop a performance baseline for comparison to actual performance because many of the products and services have not previously been measured.

Implementation of GAO Recommendations Should Help Address Performance Measurement Shortfalls

While many steps remain in defining the future of aviation weather services at en route centers—including negotiations between FAA and NWS on the provision of these services and FAA's subsequent decision on whether to obtain selected services from alternative sources—there are steps both agencies can take to ensure that the quality of future aviation weather products and services is measured and evaluated. In our accompanying report released today,⁵ we made two recommendations to the Secretary of Commerce and three recommendations to the Secretary of Transportation to improve the quality of aviation weather products and services at en route centers.

We recommended that the Secretary of Commerce direct the Assistant Administrator for the National Weather Service to

- assist FAA in developing performance measures and metrics for the products and services to be provided by center weather service units, and
- perform annual evaluations of aviation weather services provided at en route centers and provide feedback to the center weather service units.

Further, we recommended that the Secretary of the Department of Transportation direct the FAA Administrator to

- work with NWS to define performance measures and metrics for aviation weather services provided by meteorologists,
- evaluate the services it receives against those measures and metrics, and
- ensure that results of these evaluations are provided to staff stationed at center weather service units so that they can improve performance, where applicable.

In written comments on a draft of our report, the Secretary of Commerce agreed with our recommendations to assist FAA in developing performance measures and metrics, and to perform annual evaluations of aviation weather services and provide feedback to the center weather service units. The department stated that after FAA provides its revised requirements, it would work with FAA to develop methods for performance monitoring and evaluation. Subsequently, on December 19, 2007, FAA provided its revised requirements to NWS.

The Department of Transportation's Director of Audit Relations provided comments on a draft of the report via e-mail. In those comments, the department did not agree or disagree with our recommendations. The department stated that FAA's revised requirements are consistent with our recommendations in that they establish performance measures and evaluation procedures, and that FAA would begin to negotiate with NWS to implement them. In addition, in late December 2007, after reviewing our draft report, FAA and NWS signed a new interagency agreement that requires FAA to develop performance standards and measures for the assessment of center weather service units, and requires NWS to develop and track metrics to support FAA's performance measures.

FAA Identified New Aviation Weather Requirements and Performance Measures

FAA has already begun to address our recommendations; specifically, in late December 2007, FAA finalized its new requirements for the aviation weather services

⁵ GAO-08-258.

to be provided by center weather service units, which include proposed performance measures and methods for evaluation. In its requirements, FAA provides NWS with its overall vision for aviation weather services, revises existing requirements, and defines a requirement for a new product for terminal radar approach control facilities. In addition, FAA identifies performance measures and processes for evaluating performance and providing feedback to NWS.

FAA envisions services that are performance-based, standardized, continuous, and have a national scope. Specifically, FAA requires performance-based services that are measurable and allow for identifying both successful performance and any performance problems. In addition, FAA requests that the center weather service units provide standardized services to all en route centers and increase their service coverage from 16 hours a day to 24 hours a day. Finally, FAA calls for transitioning the scope of the center weather service units to monitor the entire national airspace system, rather than the respective en route center regions. This national scope is expected to allow more integrated decision-making at the national level while continuing to provide specialized products at the regional and local levels.

In its new requirements, FAA also reiterates its need for existing products and services and provides revisions to some of these requirements. Specifically, FAA continues to require products such as twice-daily briefings, center weather advisories, and the Collaborative Convective Forecast Product. In addition, center weather service units will continue to provide forecast coordination with other NWS offices, on-demand advice and consultation, emergency planning, training, and dissemination of a number of weather advisories into both NWS and FAA systems. Daily briefings, however, will now be recorded, verified, and disseminated to other facilities that do not receive an in-person briefing. In addition, on-demand consultation will be provided to en route centers, terminal radar approach control facilities, towers, and the Air Traffic System Command Center. According to the aviation services branch chief, this consultation is currently provided only to en route centers, selected terminal radar approach control facilities, and a small number of towers.

Further, the revised requirements define a new product: the terminal radar approach control forecast product. This product is based in part on decision aids currently used in select center weather service units, and on requirements developed by a team consisting of aviation meteorological stakeholders from industry and FAA. This forecast, which describes the next six hours and is updated at least every two hours, will be presented in a graphical format and include convection, winds, ceilings, and visibilities for the area around terminal radar approach control facilities. FAA also expects this product to include methods for verification and the systematic collection of user feedback.

In addition to these requirements, FAA identifies performance measures as well as processes for evaluating performance and providing feedback to the forecasters. These performance measures include customer satisfaction, forecast accuracy, and the aggregate of aircraft incidents attributed to inaccurate aviation weather forecasts. Baselines for all of these measures have not yet been developed. According to the chief of the aviation services branch, NWS will propose additional performance measures and develop baselines as it is able. To measure against these performance measures, FAA has identified methods by which to evaluate NWS. For example, to determine customer satisfaction, FAA plans to develop a questionnaire for traffic management unit staff to be filled out quarterly; to determine the aggregate of aircraft incidents attributed to inaccurate aviation weather forecasts, FAA is to use safety statistics currently tracked by the Air Traffic Organization. In addition, FAA is planning to draw on NWS's subject matter expertise to record and analyze information to determine the accuracy of forecasts.

FAA expects NWS to respond as to whether it is able to meet the requirements by early May 2008. In addition, FAA directed NWS to include plans for three operational concepts (including technical and cost information) for fulfilling the requirements—in its existing configuration located at the 21 en route centers, through remote services provided by a reduced number of regional facilities, and through remote services provided by a single centralized facility. According to the requirements, NWS's response should assume a transition time of 90 days for the existing configuration, 180 days for regionalized remote services, and one year for a single facility. For each of these concepts, FAA has requested that NWS include a technical plan, a facilities plan, a quality management plan, and a plan for transitioning to the new approach. In addition, FAA asked that NWS include cost plans for each of the concepts with the assumption of one base year and four one-year options thereafter. The cost plan is also expected to include estimated annual cost savings over this five-year period. FAA plans to select one of these operational concepts.

NWS Plans to Respond to FAA's Requirements, But Proposed Transition Timeframes May Be Overly Ambitious

NWS plans to respond to FAA by the May 2008 deadline, but FAA's estimated time frames for providing the revised services may be overly ambitious. NWS plans to submit its proposals for the three operational concepts—the existing configuration located at the 21 en route centers, remote services provided by a reduced number of regional facilities, and remote services provided by a single centralized facility. FAA directed NWS to assume a transition time of 90 days for the existing configuration, 180 days for regionalized remote services, and one year for a single facility. To respond, NWS management created a team to analyze the requirements, gain clarification on the requirements from FAA, and develop the response. The NWS aviation services branch chief reported that the agency is on track to respond by May 2008.

However, FAA's proposed time frames for transitioning to a new operational concept may be overly ambitious because of the activities that NWS should perform before any transition. In accordance with best practices and the opinion of the National Transportation Safety Board, NWS intends to validate that the organization can provide these new requirements—through a prototype or similar demonstration—before transitioning to a new approach. Leading organizations validate requirements to determine what impact the intended operational environment will have on the ability to satisfy the stakeholders' needs, expectations, constraints, and interfaces. As part of this validation, organizations explore the adequacy and completeness of requirements by developing prototypes or simulations and by obtaining feedback about them from relevant stakeholders. Given the importance of accurate and timely weather information in air traffic control, it will be important for NWS to conduct a thorough evaluation before it transitions to a new operational concept in order to ensure that there are no impacts on the continuity of air traffic operations and no degradation of weather service.

In addition, NWS has agreed to negotiate with its employees' union, the National Weather Service Employees Organization, whenever organizational changes could affect working conditions—unless the union has sufficient pre-decisional involvement. NWS's employees' union has a representative on the team that is responding to FAA's requirements, so that later negotiations may be unnecessary. However, it is too soon to determine whether negotiations will be needed and how long they will take.

NWS's aviation services branch chief agreed that FAA's transition time lines would be challenging. This official estimated that it could take over two years to transition to a new operational concept. To address this disconnect between NWS's capabilities and FAA's expectations, NWS plans to propose more feasible time frames in its response to FAA. FAA officials reported that the agency will be open to NWS's proposal.

In summary, even though center weather service units have been in operation for over two decades, neither FAA nor NWS has implemented performance measures and metrics, regularly evaluated weather service unit performance, or provided feedback to improve these aviation weather products and services. Until the agencies establish a system of performance tracking and oversight, NWS will not be able to demonstrate the quality or value of its services, and FAA will not be able to ensure the value of the services it funds. To address these shortfalls, FAA has defined more precise requirements that include performance measures and evaluation methods, and NWS is working to respond to these requirements. In its response, NWS is expected to prepare plans for three alternative operational concepts for fulfilling these requirements. FAA will choose one of the concepts. However, FAA's proposed time frames for transitioning to a new operational concept may be overly ambitious. Given the potential for major changes to services and structure, NWS may require additional time to properly validate the requirements, plan for any necessary operational transitions, and ensure that aviation weather services are not degraded by any potential changes.

Moving forward, it is important that FAA and NWS work together to ensure that NWS's aviation weather services address requirements and that effective performance measures and evaluation methods are established. This collaboration will help both agencies ensure the quality and consistency of these services, and ensure that FAA has the information it needs to effectively manage air traffic.

Mr. Chairman, this concludes my statement. I would be happy to answer any questions that you or Members of the Subcommittee may have at this time.

Appendix I:**Objectives, Scope, and Methodology**

The objectives of this statement were to summarize selected sections of our report⁶ being released today, including National Weather Service (NWS) and Federal Aviation Administration (FAA) efforts to ensure the consistency and quality of aviation weather services at en route centers, and our recommendations to improve these services. In addition, we were asked to provide an update on FAA's recent efforts to develop aviation weather requirements and performance measures, and NWS's plans for responding to these requirements.

To summarize selected sections of our report, we relied on the work supporting that report. That report contains a detailed overview of our scope and methodology.

In addition, to provide an update on FAA's recent efforts to establish requirements, we reviewed the new interagency agreement signed by both agencies in late December 2007; FAA's requirements sent to NWS on December 19, 2007; and the accompanying quality assurance plan. We also interviewed NWS's aviation services branch chief to clarify which of these requirements were new and which were revisions of current requirements.

To determine NWS's plans for responding to these requirements, we reviewed the new interagency agreement, FAA's requirements, and the accompanying quality assurance plan. We also interviewed the aviation services branch chief, who is serving in an oversight role for NWS's response to FAA. We compared NWS's tentative next steps with best practices for validating requirements from the Capability Maturity Model® Integration for Development.

We performed our work on the report and testimony from May 2007 to February 2008. All of the work on which this testimony is based was performed in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

BIOGRAPHY FOR DAVID A. POWNER

Dave is currently responsible for a large segment of GAO's information technology (IT) work, including systems development, IT investment management, and cyber critical infrastructure protection reviews. He has nearly 20 years of both public and private information technology-related experience. In the private sector, he held several executive-level positions in the telecommunications industry, including overseeing IT and financial internal audits, and software development associated with digital subscriber lines (DSL). At GAO, he has led reviews of major IT modernization efforts at Cheyenne Mountain Air Force Station, the National Weather Service, the Federal Aviation Administration, and the Internal Revenue Service. These reviews covered many information technology areas including software development maturity, information security, and enterprise architecture. Dave has an undergraduate degree from the University of Denver in Business Administration and is a graduate of the Senior Executive Fellows program at Harvard University's John F. Kennedy School of Government.

Chairman LAMPSON. Thank you, Mr. Powner. Dr. Hayes, you are recognized for five minutes.

STATEMENT OF DR. JOHN L. HAYES, ASSISTANT ADMINISTRATOR FOR WEATHER SERVICES; DIRECTOR, NATIONAL WEATHER SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

Dr. HAYES. Thank you, Mr. Chairman and Ranking Member Inglis for the opportunity to testify on the National Weather Service

⁶GAO, *Aviation Weather: FAA Is Re-evaluating Services at Key Centers; Both FAA and the National Weather Service Need to Better Ensure Product Quality*, GAO-08-258 (Washington, D.C.: Jan. 11, 2008).

provision of aviation weather information to the Federal Aviation Administration.

The Weather Service has a critical role in providing weather information to the FAA in support of their mission to ensure safe and efficient operation of the national airspace system, and we are committed to providing quality aviation services. We provide warnings, forecasts, meteorological advice, and consultation throughout all phases of flight, including preflight, planning and operations. These services come from many weather service office, including our weather forecast offices, the Alaska Aviation Weather Office, the Volcanic Ash Advisory Centers, the Aviation Weather Center in Kansas City, and the center weather service units, or CWSUs for short.

Let me focus on CWSUs. Weather service forecasters at these units provide aviation advisories, forecasts and advice to air traffic controllers. The CWSUs are located at each of 21 FAA air traffic control centers. CWSUs operate 16 hours per day, when air traffic is at its peak, and that is typically between 5:00 a.m. and 9:30 p.m., local time, seven days a week.

If weather conditions pose a threat to a center's area of responsibility, additional hours may be required, and we provide the necessary staff and service. In 2007, the Government Accounting Office reviewed aviation weather services provided to the FAA through our CWSUs. Its draft report provides a status of NWS plans for aviation weather services at FAA air-route traffic control centers. The GAO report states that we do not have formal performance measure or a formal quality-assurance program for our CWSU products and services.

It is important to note that the Weather Service does monitor and evaluate aviation products and services. Though we agree with the GAO that there are shortfalls at our CWSUs, our program does include two aviation Government Performance and Results Act, GPRA measures, one for ceiling and one for visibility forecasts, both of which can have a primary impact on takeoff and landing operations, and we have other product and service quality metrics. We also have in place a subjective assessment of CWSU operations, conducted by the local FAA traffic-management unit. These assessments are provided to FAA and weather service management.

Now, the GAO analysis also identified shortcomings and variability in some of the existing weather support for the FAA. Prior to the GAO's review, we were taking steps to improve CWSU products and services, and we had made good progress at our unit in Dallas-Fort Worth in the ARTCC. And we are using it as a model for where to take all CWSUs.

We are also taking immediate action to address issues identified in the GAO report. We will implement changes in the coming year to improve CWSU services to the FAA. Some specific include formal site visits and new standardized weather service equipment and forecast applications together with collaboration tools, which will address product and service consistency shortfalls. We have already begun working to implement CWSU best practices at all CWSUs, and we are focused on improving consistency between the various aviation forecast warnings and advisories.

The GAO has made two recommendations to NOAA. First, assist the FAA in developing performance measures and metrics for products and services to be provided by center weather service units. Second, perform annual evaluations of aviation weather services provided to en route centers and provide feedback to Center Weather Service Units. We agree with these recommendations.

Though we have measures and metrics to assess aviation products and services, which think the improvements which the GAO recommends will improve CWSU products and services, and we are currently working with the FAA to develop additional performance measures and metrics and to improve our annual evaluation of aviation weather services at the Weather Service units.

On January 10, 2008, the FAA submitted to the Weather Service specific requirements for CWSU support. I chartered a team to develop solution to meet the FAA requirements, and we are conducting a comprehensive analysis. As part of this process, we have an ongoing dialogue with the FAA at various levels to ensure that we are correctly interpreting their requirements and to ensure that our response is optimally focused on meeting the aviation need. The Weather Service response is due to the FAA by May 7, 2008, and the FAA has promised us they will reply by August 7, 2008.

In addition to looking at the future of our roles and services at CWSUs, NOAA, through the Weather Service, is also actively engaged in the Next Generation Air Transportation System, NextGen for short. We participate on the joint planning and development office board and provide leadership for the weather working group. We recognize that NextGen will result in a system-wide transformation. This includes the manner by which weather-related information is collected, managed, decimated, and used in decision-making. We also recognize the need for close coordination within the federal weather community to meet the NextGen weather support needs.

NOAA is committed to a long-term partnership with the FAA and the rest of the federal community to make this happen. The support NWS provides helps FAA create a national airspace system that is safe, efficient, and cost effective for the people of this country. Thank you for the opportunity, and I am happy to answer any questions you might have.

[The prepared statement of Dr. Hayes follows:]

PREPARED STATEMENT OF JOHN L. HAYES

Thank you, Mr. Chairman and Members of the Committee, for this opportunity to testify on the National Weather Service's provision of aviation weather information to the Federal Aviation Administration (FAA). I am Jack Hayes, Assistant Administrator for Weather Services and the Director of the National Weather Service (NWS). The Weather Service is a line office of the National Oceanic and Atmospheric Administration (NOAA), within the Department of Commerce (DOC).

The NWS has a long history of providing weather support for aviation. In 1914, eleven years after the first manned flight by the Wright brothers, the U.S. Weather Bureau, the predecessor agency to NOAA's NWS, established an aerological section to provide weather forecasts specifically to meet the growing needs of aviation. In 1918 the Weather Bureau issued its first aviation weather forecast—for the Aerial Mail Service route from New York to Chicago. Today, forecasters across the Nation comprise the aviation weather forecast team, including meteorologists at 122 local Weather Forecast Offices (WFOs), 21 Center Weather Service Units (CWSUs), the Aviation Weather Center (AWC) in Kansas City, Missouri; and the Alaska Aviation Weather Unit (AAWU) in Anchorage, Alaska.

In 1994, Public Law 103–272 directed the Secretary of Commerce to provide weather support for aviation and to give complete consideration to the recommendations of the FAA Administrator in doing so (49 USC 44720, Sec. (a)):

“The Administrator of the Federal Aviation Administration shall make recommendations to the Secretary of Commerce on providing meteorological services necessary for the safe and efficient movement of aircraft in air commerce. In providing the services, the Secretary shall cooperate with the Administrator and give complete consideration to those recommendations.”

The NWS has an extensive infrastructure supporting its products and services. NWS issues more than a trillion forecasts, and 10,000 warnings annually. Every day we process 1.7 billion surface and upper air observations from across the country and around the globe. These data are assimilated into complex computer models providing the backbone of weather information for all—government and private weather forecasters both nationally and internationally. The aviation industry is but one user of this vast array of weather information used for flight planning and safety.

The National Airspace System (NAS) is comprised of a system of airports, control towers, and other control centers, including Air Route Traffic Control Centers (ARTCC), working around the clock, 365 days a year, moving the country's people and goods around the United States. On an average day, nearly 50,000 flights transit the NAS. Flights include general aviation, commercial air carrier, air taxi, military, and cargo flights. Depending on the departure point, the length of time in flight, and the destination, each flight will encounter a variety of meteorological conditions.

Keeping aircraft away from hazardous weather in all phases of flight is a key to air safety. The NWS has a critical role in providing weather information for safe and efficient operations in the NAS and in support of the FAA's mission. NWS provides warnings, forecasts, meteorological advice, and consultation for partners and customers throughout all phases of flight—pre-flight, planning, and operations. In order to mitigate weather-induced disruptions to the NAS, the FAA, in conjunction with other NAS stakeholders, relies on this information as one of the elements in the traffic flow management planning process.

NWS and the Meteorological Office of the United Kingdom provide international flight planning forecasts and internationally required meteorological forecast parameters for global aeronautical operations via the World Area Forecast System as requested by the International Civil Aviation Organization. We operate three Meteorological Watch Offices: in Kansas City, Missouri; in Anchorage, Alaska; and in Honolulu, Hawaii—to help provide these warning, forecast, and advisory services for the national and international aviation community. The Alaska Meteorological Watch Office is part of the Alaska Aviation Weather Office (AAWU). Also part of the AAWU is the Alaska Volcanic Ash Advisory Center. NOAA operates two of the nine worldwide Volcanic Ash Advisory Centers, one in Washington, D.C. and the other in Anchorage, Alaska. Volcanic Ash Advisory Centers are the focal points for gathering and evaluating information on volcanic eruptions that could affect air travel. The Volcanic Ash Advisory Center in Anchorage, Alaska is managed and staffed by the NWS. The Volcanic Ash Advisory Center in Washington, D.C. is jointly managed and staffed by the NWS and the National Environmental Satellite Data and Information Service, a sister line office within NOAA.

The Aviation Weather Center (AWC) in Kansas City, Missouri, operates 24 hours a day, seven days per week, throughout the year providing aviation warnings and forecasts of hazardous flight conditions at all levels within domestic and international air space including turbulence, icing, and convection forecasts. The Collaborative Convective Forecast Product, a graphical representation of expected convective occurrence at two, four, and six hours, is produced by the AWC after collaboration with Meteorological Service of Canada, Center Weather Service Units, and meteorological offices of airlines and service providers. Its primary users are air traffic management which includes both FAA and the airline industry.

The number of cross-polar flights is increasing sharply. With less protective atmosphere above the polar regions, these flights are more susceptible to the effects of radiation. The NWS Space Weather Prediction Center (SWPC) in Boulder, Colorado, continually monitors and forecasts Earth's space weather environment and provides solar-radiation information and alerts.

On the local scale, 122 Weather Forecast Offices provide terminal area forecasts for approximately 625 locations every six hours, with updates as conditions change. These forecasts consist of the expected weather that is significant to a given airport or terminal area.

Center Weather Service Units (CWSU) were established in 1977 in response to National Transportation Safety Board recommendation A-77-68, resulting from a serious weather related accident over New Hope, Georgia, which caused numerous fatalities. This recommendation called for the FAA to "Formulate rules and procedures for the timely dissemination by air traffic controllers of all available severe weather information to inbound and outbound flights in the terminal areas." Based on this recommendation, FAA, with the assistance of NWS, formed the CWSUs.

NWS forecasters at CWSUs provide advisories and forecasts to the aviation community as well as advice and consultation to air traffic controllers in maintaining an efficient national airspace. These CWSUs are located at each of the 21 FAA ARTCCs. CWSU meteorologists provide Meteorological Impact Statements, Center Weather Advisories, periodic face-to-face briefings, and on-demand consultations. CWSU meteorologists also provide briefings, as needed, to FAA Terminal Radar Approach Control personnel and tower personnel, and they train controllers on the interpretation of weather information.

Under an interagency agreement, the FAA provides basic equipment, communications, space and supplies at the CWSUs, and currently reimburses the NWS about \$12M per year, for staff. Based on local requirements, CWSUs operate 16 hours per day, typically between 5:00 a.m. and 9:30 p.m. local time, seven days a week, when air traffic is at its peak. If weather conditions pose a threat to an ARTCC's area of responsibility at other times, the Traffic Management Officer, in conjunction with the CWSU Meteorologist-In-Charge, has the option to retain CWSU forecasters on overtime.

The NWS has a long history of working in partnership with the FAA and the aviation community to define requirements for the provision of aviation weather services. In that vein FAA's System Operation Services sent NWS a letter dated September 23, 2005, requesting NWS restructure its CWSU support. FAA requested NWS reduce the number of CWSUs in the contiguous states, reduce personnel costs by 20 percent, increase coverage to 24 hours a day, seven days a week, and provide improved products, services, collaboration and training, as well as create national standards. NWS chartered a team to examine options to meet the FAA request. NWS presented its proposal for restructuring its aviation weather services to FAA in October 2006. A second letter from FAA in April 2007 stated it would not adopt the NWS restructuring plan, but instead had begun a process of refining requirements for weather services provided by the CWSUs.

On January 10, 2008, FAA submitted to NWS specific requirements for CWSU support, asking NWS to provide three business case solutions to meet those requirements: support from a single, central site; regional support from several sites; and CWSU service support from the existing 21 ARTCCs. I chartered a team to develop solutions to meet FAA's requirements and we have made progress with our comprehensive analysis. The NWS response is due to FAA by May 7, 2008. FAA promises to reply by August 7, 2008.

In 2007, the Government Accountability Office (GAO) conducted a review of aviation weather services between the FAA and NOAA. The draft report, entitled *Aviation Weather: FAA is Reevaluating Services at Key Centers; Both FAA and the National Weather Service Need to Better Ensure Product Quality*, does a fair job in assessing the status of the NWS's plans for providing aviation weather services at FAA's en route centers and evaluating current abilities to ensure consistency and quality of these services. In its draft report, the GAO made two recommendations to NOAA: (1) "Assist FAA in developing performance measures and metrics for the products and services to be provided by center weather service units; and (2) "Perform annual evaluations of aviation weather services provided to en route centers and provide feedback to the center weather service units." NOAA agrees with Recommendation 1 and we are currently working with the FAA to develop performance measures and metrics for the Center Weather Service Unit products and services. We believe subsequent collaboration between NOAA and FAA should lead to a shared service level agreement on milestones, performance measures and goals. With regard to Recommendation 2, NOAA will work with the FAA to develop methods for performance monitoring and evaluation based upon the FAA's service requirements. We expect these methods will involve annual evaluations, at a minimum.

We believe GAO is on target with its analysis identifying shortcomings and variability in some of the existing CWSU support for FAA. We are taking action to improve CWSU services to the FAA and are working toward taking the best ideas from all of our CWSUs and creating a more consistent and responsive customer service oriented program. Furthermore, we are also working toward consistency between various aviation related forecasts, warnings, and advisories issued by the NWS. We drafted a plan to evaluate the CWSUs and have begun coordination with the FAA.

As you know, the Next Generation Air Transportation System (NextGen) is intended to meet projected 2025 U.S. air transportation demands for significant growth in air traffic and airport services. NOAA/NWS is actively involved in NextGen through its participation on the Joint Planning and Development Office (JPDO) Board and in providing leadership for the JPDO Weather Working Group.

NOAA/NWS recognizes that NextGen will result in a system-wide transformation including the manner by which weather-related information is collected, managed, disseminated, and utilized in decision-making. To that end, NOAA/NWS plans to fully integrate NOAA's weather development activity into NextGen development; link NOAA funding requests for acquisition and development of weather information needed to support NextGen to FAA NextGen funding requests; design NOAA's contributions for NextGen-era weather support to meet FAA's requirements; and ensure NOAA's contributions are compatible with NextGen dissemination and display systems.

Finally, NOAA/NWS recognizes the need for extraordinarily close coordination within the federal weather community to meet NextGen weather support needs and believes it is essential that the federal community bring all of our assets together effectively, along with strong private sector participation, to ensure success. NOAA is committed to a long-term partnership with FAA, and the rest of the federal community, to make this happen.

The support NWS provides—whether it is a terminal forecast from a WFO, a Center Weather Advisory from a CWSU, an icing warning from the AWC, or a radiation alert from our SWPC—all help FAA create a National Airspace System that is safe, efficient and cost effective for the people of this country.

BIOGRAPHY FOR JOHN L. HAYES

John L. "Jack" Hayes is the NOAA Assistant Administrator for Weather Services and National Weather Service Director. In this role, he is responsible for the day-to-day civilian weather operations of 122 local Weather Forecast Offices, 13 River Forecast Centers, nine National Centers for Environmental Prediction, and 21 Aviation Weather Service Units in the United States, Puerto Rico, Hawaii, and Guam.

The National Weather Service (NWS) provides daily weather forecasts and warnings to the American media, emergency managers, fire land managers, commercial weather partners, and the general public for weather and natural hazards such as hurricanes, tornadoes, severe thunderstorms, flash floods, winter storms, extreme fire weather conditions, tsunamis, and solar flares.

Dr. Hayes rejoined the National Weather Service after serving as the director of the World Weather Watch Department at the World Meteorological Organization (WMO), a specialized agency of the United Nations located in Geneva, Switzerland. In that position, he was responsible for the global observing, global telecommunications, and global data processing and forecasting systems that provide the foundation for operational weather forecasting and warning services for 188 WMO member countries worldwide. During this period, he led the development of the WMO Strategic Plan which was approved by WMO's 15th Congress in May 2007.

Before joining the WMO, he served in several senior executive positions at NOAA. As the deputy assistant administrator for NOAA Research, he was responsible for the management of research programs. As Deputy Assistant Administrator of the National Ocean Service (NOS), he was the chief operating officer dealing with a multitude of ocean and coastal challenges, including NOS's response to the Hurricane Katrina disaster in August 2005. As Director of Office of Science and Technology for the NWS, he was responsible for the infusion of new science and technology essential to weather service operations; he was recognized as one of the Federal Government's Top 100 IT Executives for his leadership of programs to improve information processing and dissemination supporting NWS's weather forecast and warning mission.

Dr. Hayes was also an executive in the private sector and the military. He was general manager of the \$500 million Automated Weather Interactive Processing System program at Litton-PRC from 1998 through 2000. AWIPS is the interactive computer system utilized by all weather service forecasters. From 1970 through 1998, he held a variety of meteorological positions with the United States Air Force, beginning as a weather forecast officer in 1970 and culminating his career as Commander of the Air Force Weather Agency and Air Force Global Weather Center.

He received both his Ph.D. and Master of Science degrees in meteorology from the Naval Post Graduate School in Monterey, California. He is a graduate of Bowling Green State University, with a Bachelor's degree in mathematics. He is a Fellow in the American Meteorological Society.

Chairman LAMPSON. Thank you, Dr. Hayes. Mr. Juba, you are recognized for five minutes.

STATEMENT OF MR. EUGENE D. JUBA, SENIOR VICE PRESIDENT FOR FINANCE SERVICES, AIR TRAFFIC ORGANIZATION, FEDERAL AVIATION ADMINISTRATION

Mr. JUBA. Good afternoon, Chairman Lampson and Congressman Inglis. My name is Gene Juba, and I am the Senior Vice President for Finance at the ATO, the Air Traffic Organization, part of the FAA. I spent the past 20 years in the aviation industry, first with the airlines, and now in my position here at the FAA. I am pleased to be here today to discuss the findings and the recommendations of the GAO regarding FAA's provision of aviation and weather services from the National Weather Service.

The Federal Aviation Administration is responsible for ensuring safe, orderly, and efficient air travel in the national airspace system. We safely guide over 50,000 aircraft, per day, through the Nation's skies. FAA and NWS have worked together for many years to provide weather forecast services for pilots, controllers, and all users of the Nation's airspace. The National Weather Services began providing aviation meteorology at the FAA's en route centers following the NTSB's report on the crash in 1977 of Southern Airways Flight 242. The FAA with the assistance of the NWS created Center Weather Service Units, or CWSUs, that are located at each of the FAA's 21 en route centers.

In recent years, FAA has taken action to assess and improve the performance of the Center Weather Service Units. FAA found that the CWSUs were not providing the same level of services at all of its locations, and that the services and forecasts were not standardized across the 21 centers, the results of low collaboration or communication between the CWSUs at each of the stations. Neither the FAA nor the NWS had a formal quality-assurance program for weather products and services. To address these concerns, the FAA requested the NWS restructure its aviation weather services, improve the capability and delivery of weather information, and to transform the current collection of isolated units to a national program for support of all FAA field units or field sites.

The NWS submitted its restructuring proposal to the FAA in October 2006. In addition to the Weather Service effort, the FAA conducted a market survey to determine private-sector capability in delivering those weather services needed by its controllers. Organizations, including a government laboratory, responded to that survey. The FAA reviewed both NWS's proposal and the results of the market survey. Based on that review, the FAA chose to refine its requirements for the CWSU service. They completed this exercise and provided new requirements to the Weather Service last month.

The performance-based requirements suggest a new approach as to how weather services are generated and delivered. The requirements addressed deficiencies the FAA has identified in its CWSU service, such as a fragmented approach to aviation weather forecasting. They have requested that forecasts across regional boundaries be more consistent and that more attention and resources be devoted to area where active weather conditions exist and less to where weather is of less impact on aviation. The requirements also

request that NWS provide services on a 24-hour-a-day, seven-day-a-week basis, rather than the current 16 hours per day. We must evolve our delivery of weather information to support the Next Generation Air Traffic System, and these requirements set us on that path.

I thank the GAO for their careful analysis and positive recommendations. The FAA agrees with their recommendations, and in building the requirements for the CWSU service, it has added a component for performance evaluation. We are asking for a set of negotiated performance metrics that match aviation weather services being provided. Oversight will be done jointly between the FAA and the national weather service.

In conclusion, Mr. Chairman, the FAA and the Weather Service are doing their utmost to improve the CWSU service. FAA has continuously held meeting with the Weather Service, throughout the requirement-development phase, and continues to hold biweekly meetings during the proposal-development process, to ensure that the NSW is provided sufficient information and the opportunity to develop an improved service. The FAA looks forward to the NSW's future concept of operations for the central weather service units and hopes to continue our cooperative relations well into the future to reduce the impact weather has on aviation.

We also welcome Congress's advice and counsel as we work with the National Weather Service to improve the efficiency and effectiveness of the center weather service unit services.

This concludes my remarks, and I would be happy to answer any questions the Committee might have.

[The prepared statement of Mr. Juba follows:]

PREPARED STATEMENT OF EUGENE D. JUBA

Good Afternoon, Chairman Lampson, Congressman Inglis, and Members of the Subcommittee, my name is Gene Juba, and I am the Senior Vice President for Finance in the FAA's Air Traffic Organization. I am honored to be here today to discuss the findings and recommendations of the GAO regarding FAA's provision of aviation weather services from NOAA's National Weather Service. FAA believes that working together with NWS, we will be able to fulfill the new requirements for aviation weather services which FAA recently sent to the NWS, and move towards a better alignment of current services with the future requirements envisioned in the NextGen Concept of Operations.

The Federal Aviation Administration is responsible for ensuring safe, orderly, and efficient air travel in the National Airspace System. The legislative foundation of the Federal Government's regulation of civil aviation was the *Air Commerce Act of 1926*. This landmark legislation was passed in the belief that the aviation industry could not reach its full potential without federal action to establish and maintain safety standards. The Act charged the Secretary of Commerce with fostering air commerce, issuing and enforcing air traffic rules, licensing pilots, certifying aircraft, establishing runways and operating and maintaining aids to navigation.

The Department of Commerce continued oversight and regulation of civil aviation until 1938, when the *Civil Aeronautics Act* transferred federal civil aviation responsibilities to a new independent agency, the Civil Aeronautics Authority. In 1958, passage of the *Federal Aviation Act* transferred the CAA's functions to the newly created Federal Aviation Agency, and the FAA was born. The FAA became the Federal Aviation Administration upon the creation of the Department of Transportation in 1967, and the FAA's becoming one of the modal organizations within the new Department.

All through these years, the FAA and the Weather Bureau cooperated to provide weather forecast services for pilots to improve the safety of the Nation's aviation system. A formal arrangement by which the National Weather Service would provide aviation weather services directly through co-location of NWS meteorologists at FAA facilities was established following the NTSB's report on the 1977 crash of

Southern Airways flight 242. The NTSB's recommendation called for the FAA to, "formulate rules and procedures for the timely dissemination by air traffic controllers of all available severe weather information to inbound and outbound flights in the terminal areas." Based on this recommendation, the FAA, with the assistance of the NWS, created the Center Weather Service Units (CWSU), which are located at each of the FAA's 21 Air Route Traffic Control Centers (ARTCC) across the United States.

This relationship between the FAA and the NWS was codified in 1994, when Public Law 103-272 directed that, "The Administrator of the Federal Aviation Administration shall make recommendations to the Secretary of Commerce on providing meteorological services necessary for the safe and efficient movement of aircraft in air commerce. In providing the services, the Secretary shall cooperate with the Administrator and give complete consideration to those recommendations." (49 U.S.C. 44720(a))

Presently, the FAA alone spends over \$200 million a year on aviation weather services, through over 40 observing systems, processes and communications services. This is independent of the NWS spending for aviation weather forecasting and research. FAA spends approximately \$12 million a year to support the 84 NWS employees located at 21 CWSUs to provide services to FAA traffic management personnel located at the air traffic control facilities throughout the National Airspace System (NAS). The NWS also provides aviation weather services through entities such as the Alaska Aviation Weather Office, the Volcanic Ash Advisory Centers, the Aviation Weather Center in Kansas City, Missouri, and Weather Forecast Offices. NWS provides warning, forecasts, meteorological advice and consultation for FAA and other customers throughout all phases of flight; pre-flight, planning, and operations.

In recent years, the FAA has undertaken a number of initiatives to assess and improve the performance of the Center Weather Service Units. FAA found that the CWSUs were not providing the same level of services at all of its locations, and the services and forecasts were not standardized across the 21 locations. There was also little collaboration or communication between the different CWSUs. In addition, neither the FAA nor the NWS had a formal quality assurance program for CWSU products and services.

To address these concerns, FAA requested that the NWS restructure its aviation weather services to provide improved services in a more efficient, performance-based process. While the NWS was developing its proposal for restructuring its aviation weather services, FAA conducted a market survey to determine if the private sector could provide the weather services FAA needed. Ten organizations, including government laboratories and private sector firms, responded to the market survey that they could provide the services FAA requested. The NWS submitted its restructuring proposal to FAA in October 2006. In April 2007, FAA declined the NWS proposal for restructuring its aviation weather services provided to FAA, primarily because, in the intervening time, we had initiated an internal review of our requirements, and had not yet completed this review. The results of that review are the new requirements which were provided to the NWS in January 2008.

However, we are serious about effective interagency cooperation and continue to work with the NWS on improving CWSU services. We decided that we would refine our requirements for the services provided by the CWSUs because our existing requirements were too broad to ensure the efficiency and cost effectiveness of the services. Also, as GAO found, FAA did not have a system in place to provide quality assurance of the services provided by the NWS, and thus could not objectively evaluate the accuracy, efficiency and cost effectiveness of the Center Weather Service Units.

The FAA agrees with the recommendations of the GAO, and in building the new requirements for the CWSU service, added a component of performance evaluation. The performance mechanism calls for setting up a team of individuals from both FAA and NWS, which will convene regularly and monitor and provide recommendations on CWSU services based upon a negotiated set of performance metrics. The goal of this team is to install a mechanism that will improve CWSU service on a continuing basis and enhance the FAA-NWS aviation weather relationship at the same time. Most importantly, we must ensure that aviation weather services meet the needs of the aviation community.

In January 2008, FAA provided NWS with revised and clarified requirements. The new performance based requirements request a new approach to how the products are generated and delivered. The requirements address deficiencies the FAA has identified with CWSU service, such as a fragmented approach to aviation weather forecasting, with 21 aviation weather forecasts developed independently of one another, and sometimes producing inconsistent products across the NAS. FAA

has requested that forecasts across regional boundaries be consistent and that more attention be devoted to areas with “active” weather conditions, and less to areas where weather patterns are having less impact on aviation operations. The new requirements also request CWSU services on a 24 hour a day, seven days a week basis, rather than the current 16 hours a day, seven days a week services. Planes are increasingly operating on a 24/7 basis, and aviation weather services need to evolve to meet that demand.

FAA views the new requirements as moving current aviation weather services towards the FAA’s future requirements envisioned in the NextGen Concept of Operations. The NWS is the team lead for developing the aviation weather services observing systems, forecasting services, and communications delivery systems for the interagency NextGen system effort, and FAA believes that the new requirements for CWSU services will help NWS better align itself with the NextGen requirements.

In conclusion, Mr. Chairman, the FAA and the NWS are doing their utmost to improve the CWSU service. FAA has continuously held meetings with the NWS throughout the requirements development process, and continues to hold bi-weekly meetings with NWS during the proposal development process to ensure that the NWS is provided sufficient information and opportunity to develop an improved CWSU service. We believe the NWS is committed to providing their best response to these requirements. The FAA looks forward to the NWS’s future concept of operations for the Center Weather Service Units, and hopes to continue our cooperative relationship well into the future to reduce the impact weather has on aviation.

We thank the GAO for their careful analysis and positive recommendations to institute performance measurements and metrics to improve the quality and cost effectiveness of aviation weather services. We also welcome Congress’ assistance and counsel as we work with the National Weather Service to improve the efficiency and effectiveness of Center Weather Service Unit services.

This concludes my remarks, and I would be happy to answer any questions the Committee may have.

BIOGRAPHY FOR EUGENE D. JUBA

Eugene D. Juba is a finance professional with 15 years experience in the private sector. Prior to joining the ATO, he was working as an independent consultant and as the CFO for a technology startup in the Washington, DC area. Prior to this assignment, he worked at two major commercial airlines.

In 1999, he joined U.S. Airways as Vice President of Financial Planning and Analysis. There he led a group of finance, operations research and industrial engineering professionals and was responsible for the development of operating budget and providing analytic support of other departments on key strategic initiatives. His group also led process re-engineering efforts in all parts of the operation.

Prior to going to U.S. Airways, Juba spent 11 years at United Airlines in a number of roles including Director of Financial Analysis, Assistant Treasurer and Corporate Development. The breadth of activities he was involved in included labor negotiations, financing of aircraft and facilities, stakeholder presentations, structuring of the United ESOP and the development of the original business plan for Shuttle by United.

Juba attended the U.S. Naval Academy graduating in 1981 with a Bachelor’s of Science degree in Electrical Engineering. Upon graduation, he served as a naval officer aboard the nuclear submarine USS Benjamin Franklin. Upon leaving the Navy, he attended the Wharton School at the University of Pennsylvania earning a Master in Business Administration degree in Finance in 1988.

Juba resides with his wife, Dianne, and two sons, Warren and Collin, in McLean, Va.

DISCUSSION

Chairman LAMPSON. Thank you, Mr. Juba. I will now entertain questions from the panel of Members, and I will recognize myself for the first five minutes.

RELATIONSHIP BETWEEN FAA AND NWS

I will start, Mr. Powner, with you and ask you how you would characterize the relationship between the FAA and the National Weather Service in the context of this program? It just seems to

me that the problem here is attributable to poor communication between the two agencies. Would improvement in this area help to move this program in the right direction?

Mr. POWNER. Clearly, I would characterize it with one word: improving. I think, historically, the collaboration and coordination between the two agencies, at the working level, there may have been a lot going on, but clearly, at the executive level, it is improving, and that is a good thing to move forward, that we clearly understand the requirements going forward. We have agreement on that, and we also have agreement on how we are going to measure it to constantly improve these services.

Chairman LAMPSON. There are a lot of issues. Are the steps that are being taken to address the issues between the FAA and NSW, are they reasonable steps?

Mr. POWNER. Yes, I believe the delivery of the requirements was a very positive step at the conclusion of our review. You know, going forward, now there is some hard work ahead of us to get agreement on that, to establish additional measures, to establish clear baselines, and then to actually implement this. So yes, right now, we are moving in the right direction, but there is clearly a lot of work ahead.

EVALUATING THE PERFORMANCE OF CWSUs

Chairman LAMPSON. FAA's testimony refers to several studies that they did to evaluate CWSUs, and your report indicates that FAA had never specified requirements for the services to be delivered to them, and neither FAA or NWS have any system to evaluate the performance of the CWSUs. Would you elaborate on that apparent discrepancy?

Mr. POWNER. Well, clearly, FAA has studied the situation, and it has been widely acknowledged here on this panel that the services have been, you know, inconsistent and not standardized. We have heard that, clearly, there were some en route centers that they were more pleased with than others with the services, and the requirements, to date, have not been specified to the level that have recently been delivered. And I think with that specificity comes, you know, improvement in an understanding in what needs to be delivered, and ultimately, hopefully, an improvement in the services that NWS provides.

RESPONDING TO NEW FAA REQUIREMENTS

Chairman LAMPSON. Thank you. Dr. Hayes, what are your plans for responding to FAA's new requirements?

Dr. HAYES. Well, as I mentioned in testimony, I formed a team, and there are three scenarios that they would like us to propose to, involving how we would meet their requirements, and they have been very detailed in their requirements, and so I have a team, and there are three subsets of that team, each one focused on optimizing products and services in support of aviation for that particular scenario. And then there is cross-talk between the teams.

As Mr. Juba has mentioned, there has been an ongoing dialogue between my team and the FAA. In fact, within the next week, they are going to go over it, because I have just seen a rough draft of

the proposal. We are going to run the proposal by them within the next one—I would say a week to ten days, in time to get feedback that if we are in the wrong operating quadrant, if we are missing the mark, then, we have time to recover, and we intend to meet the date that they have given us, which is May 7.

So I think there is a good dialogue going on at the worker level. I have also, at my level, have been talking with Mr. Juba, with Mr. Cox, who is the Vice President for Flight Operations. I have, on my March calendar, Mr. Sam Martino, who is VP for Systems Operation. So I am going to engage at all levels, from my level on down to the people on the team, and Congressman, I am hoping with that we will meet the need.

ENSURING CONSISTENCY OF WEATHER PRODUCTS AND SERVICES

Chairman LAMPSON. How can you better ensure consistency among aviation weather products and services provided by the Center Weather Service Units, weather forecast offices and the Aviation Weather Center?

Dr. HAYES. We have three initiatives going on at the present time. One of them is, clearly, what the GAO said, metrics. The FAA has a metric referred to as the weather impact traffic index. If you look at the output of that metric, it tells us when we are over-forecasting for an air route or under-forecasting. That, we are going to use as the basis, so we have an ongoing effort to develop a standardized metric within the Weather Service of our products and services. It relates directly to what the FAA is using to measure what its air route traffic controllers do.

That is one. There will be other metrics that we will incorporate that are product related from our center units. We also are going to implement by the end of the year a field visit program. And it is not going to be a subjective one. We are going to have somebody from the FAA on the team; and we will have somebody from my headquarters. We will assure that there is a report written with findings and recommendations, and that will come to senior leadership of the Weather Service.

And then, the last thing that I will tell you is I am aware of the feedback we get on the operation at Dallas-Fort Worth. The FAA tells me this is a top-tier operation, and they have told me that there are others that aren't so good. And so what I have done is I have been out to Dallas-Fort Worth, seen the operation. My deputy has been out there, and I have sent one of my regional directors out there to see it, and we are going to focus on another ARTTC and how I can migrate some of those best practices right into that, and then we are going to broaden them across the Weather Service. So I think, in my mind, that will take a big bite out of the consistency program, and there are other measures that we have in mind as well.

Chairman LAMPSON. Figure out what they are doing right, and bottle it.

Dr. HAYES. Yes, sir.

Chairman LAMPSON. I am going to stop for just a minute and recognize Mr. Inglis for his questions, and I will come back with a few others.

NWS COMMUNICATION WITH THE FAA

Mr. INGLIS. Thank you, Mr. Chairman.

Dr. Hayes, are there other customers of the National Weather Service that want information delivered in a different way? Is that correct? Or is FAA a major customer of the National Weather Service.

Dr. HAYES. Sir, I would say FAA is a major customer of the Weather Service. We have emergency managers that want information, and our mission is to protect life and property, and so we take it very seriously, and we listen to them, and so my aim is to do the same to another very important customer of the Weather Service, and that is the FAA.

Mr. INGLIS. Is that the organization—it sounds like this may be relatively recent. We have been talking about exactly how to deliver it the way that FAA wants it. Is that a new thing, or has that been an ongoing conversation?

Dr. HAYES. I think it has been ongoing. I think to a certain extent, senior leadership in the Weather Service bears some responsibility for not hearing what the FAA is saying, and I think there is no way to candy-coat that. I think it is important to recognize that, and then just to focus on doing a better job listening and dialoguing, and that is what I hope to do on an executive level.

Mr. INGLIS. I wonder if—was shipping, for example, something about the way the National Weather Service delivers it, more designed for shipping interests or—

Dr. HAYES. Sir, I think if there are differences, what we did when we created the Center Weather Service Units. In an effort to ensure customer responsiveness to the FAA and the ARTTCs, we integrated the IT that does the delivery into their architecture. We have a separate weather service architecture that we use for the public, and while take great effort to ensure consistency, there are differences because you have two different architectures that are going to occur.

It is our intent to work with the FAA to make sure that where there are differences, there are good reasons, and where there are differences, they do not have any significance to the quality of the products and services we provide.

FAA WEATHER CONTRACTING

Mr. INGLIS. Mr. Juba, could you go somewhere else to get weather information? Contract with somebody else besides the National Weather Service?

Mr. JUBA. Just look at our weather portfolio today. We actually get weather information from a number of different people and services out there. Obviously, the National Weather Service is an important part of that, but today, we have weather-sensing equipment. We have what we call the automated ASOS, which are equipment at airports that give us information on ceiling and on temperature. Some are maintained by us, and some are maintained by the Weather Service. So there are a number of different areas where we can get weather information.

When we did the market survey last year, too, there was—we did get ten people, including one government laboratory that was actu-

ally interested in—or that had the capability or thought they had the capability to provide that service. On the CWSUs, specifically, we are working with National Weather Service, today, to hope get deliver of information in a manner that meets both of our needs.

Mr. INGLIS. If it doesn't, do you have statutory authority to go deal with somebody else? The second part of that question, do you pay National Weather Service, or does money move from FAA to National Weather Service?

Mr. JUBA. To answer the latter question, we pay the National Weather Service about \$12 million for the center weather service units. On the first part, we are optimistic in getting to an agreement with the Weather Service on how to evolve the CWSUs. What makes me optimistic is I look at another important thing we are doing within the agency, which is looking to the next generation concept of operations. There is a working group there, the weather working group, of which the Weather Service, ourselves, DOD and some other agencies actually sit on, so we are actually getting a common view of where we want to take weather information, collection, generation, dissemination. So we have that goal we are looking to get to. That is part of the reason why we put together our new requirements because we need to head towards that goal. It makes me optimistic, because the Weather Service has the same goal. I am optimistic that we will get there.

Mr. INGLIS. Now, do you share the optimism that the deadline will be met?

Mr. JUBA. The May deadline? Well, if Dr. Hayes says he will meet the date, then I assume he will meet the date. I mean there is a lot that the Weather Service has done and has stepped up since the report came out and the time of this hearing, and I have been impressed with the actions to date, so yes, I am optimistic, cautiously optimistic, but I am hopeful that he meets the date.

Mr. INGLIS. Thanks. Thank you, Mr. Chairman.

Chairman LAMPSON. Thank you, Mr. Inglis. I recognize myself for five minutes.

And Dr. Hayes, if the FAA considered out-sourcing the Weather Services NWS provides, do you thin these services can be achieved either at a comparable level or better than the National Weather Service products and services? Can you make it—and could it be made to be more cost efficient?

Dr. HAYES. Congressman, I am going to give you a biased answer. The government has given us the mission and responsibility to provide aviation services to the FAA. And if weather forecasts and warnings have the potential to impact public safety, we think we need to be involved, and I intend to show with our actions that we can do better than what they can do elsewhere.

I will say—and I guess I will just leave it at that, sir.

Chairman LAMPSON. Let me take it back for just a second. Cost efficiency: the first question that comes to mind, if they are going to provide, essentially, the same service as what your service is providing, can it be done for the same cost? Would it be more cost efficient to have a private entity to do it as opposed to a public entity?

Dr. HAYES. That is a difficult question to answer in the fact that I don't know of a private-sector company out there that can do ev-

everything we do. And we do everything from the observing—that is the balloons we launch every 12 hours—to the model runs, processing of the data on high-performance computing systems. And so if they were to take on that entire mission, there is no way that I believe that they could.

I believe that we have shown with our support to emergency managers that we are the most effective supplier of that information, and I think that we can do the same thing for the FAA far more efficiently than can be done in the private sector.

Chairman LAMPSON. Thank you. Mr. Juba, do you want to comment on that?

Mr. JUBA. It would be premature for me to comment, you know, before we see the proposal put together, but they are looking at—they are taking a hard look at how they provide the service.

And you get back to the expertise. It is not a question on expertise. The Weather Service has that. I think what we are looking at is the, you know, are we doing the best we can to deliver weather information. This is—the CWSUs have been in place for a number of years, and technology has evolved over that time. We saw that through our market survey, and I think with use of that technology and increasing capability, I think the Weather Service can get to it.

MORE ON CWSU SUPPORT

Chairman LAMPSON. Is it your plan to seek weather service support for the Center Weather Service Units from outside sources? Will you all go forward with your request?

Mr. JUBA. Right now, we are talking solely with the Weather Service on that. We provided the requirements that we put together that we provided them last month, and they only went to the Weather Service.

Chairman LAMPSON. What are your time frames for—let me go back. CWSUs arrangement has been in place for some two decades, over two decades. Why haven't you implemented performance measures for these weather services before now?

Dr. HAYES. I think, Congressman, I should answer that because here are units, and I would say that we did have metrics evaluating our primary products and services. They were being produced outside of the CWSUs, and the primary focus of the CWSUs was originally decision assistance, and it was taking products produced elsewhere and conveying those to controllers in the FAA. We have evolved the mission. There is production going on at CWSUs, and I say that we need to develop those measures now, and we will.

EVALUATING NWS PROPOSALS

Chairman LAMPSON. Mr. Juba, how do you plan to evaluate the proposals that NWS will submit?

Mr. JUBA. One of the things we noted earlier, the deficiencies we saw with the service being delivered today, so we are looking at how the Weather Service changed what they do with the CWSUs in those specific areas, those areas being, you know, fragmented approach, the inconsistency across regional lines, you know, one en route center versus another, you know, having two different fore-

casts conflicting. We need that standard product, that nationwide look at how weather information is delivered and a consistent product, so we will be looking in those areas. We have expertise, you know, within the FAA that deals with air traffic measuring units that are actually the customers of that service that will be involved in the evaluation of the proposal. Plus, we are advantaged also, having done the market survey a year ago, we know what is out there in the market and what the capabilities are. We also, a year ago, did a prototype of remote delivery of weather information from a remote location to a customer organization or customer site, so we know that is available and that it does work.

Chairman LAMPSON. Mr. Juba, the requirements were produced after the survey, were they not? And if so, how can that be used to really make a good decision with the services?

Mr. JUBA. That is correct. The survey was put out last year, and our new requirements came out last month. What was referred to on the surveys, we, through the survey, it gave us an idea of what can be done, you know, what capabilities are out there, currently, in the commercial world, for delivery of weather information. I mean that is a benchmark, if you will, on the possible, but I mean there is no—you know, it is not a price comparison or anything.

NWS AND FAA WORKING COOPERATIVELY

Chairman LAMPSON. To both Dr. Hayes and Mr. Juba, the picture GAO paints of the past working relationship between your two organizations is not an attractive one. Your relationship appears to have been characterized by a lack of coordination and cooperation. I believe you and your agencies are now moving in the right direction. The safety of the public and the effective management of our air traffic system are, obviously, paramount concerns, so please fix the problem. FAA needs to define their need and communicate them effectively to the National Weather Service. The National Weather Service needs to do a better job of ensuring consistency in service delivery and should be responsive to FAA's need for cost-effective, high quality forecasting information. Both agencies should work together in a cooperative fashion to design and implement a high quality aviation weather service—or weather forecast system that we need. So would you care to comment? Both of you?

Dr. HAYES. Sir, you have my strongest commitment to do what you just said, because that is what our intent is to do.

Chairman LAMPSON. Thank you. Mr. Juba.

Mr. JUBA. Yes, we are committed, also. We have worked with the Weather Service, again, to develop our requirements and actually meet with them biweekly, today, as they put together their proposal. We are committed to working with them.

Chairman LAMPSON. Excellent. I think that we have developed such a feeling among the public, I think, that our bureaucracy is getting such to the point where we are not capable of providing services, and that there is such a lack of communication. I was in a meeting this morning that had to do with the area from which I come in Texas, and the agency with whom—several Members from our area were meeting and said that it was the first time they had seen a unified support for a project, and it is strange that we

have to have comments made like that, that it is out of the ordinary for us to actually work together.

It has been disheartening to me for a long period of time, but I see the opportunity for things to change, and with those kinds of commitments, we really can be responsive to the needs of our people, not responsive to the needs of the politics of some. And it would be nice when we can say that about everybody and we quit playing some of the games that we seem to have been playing over time.

Mr. Inglis, that is all I have to say. If you have——

Mr. INGLIS. I have no further questions, Mr. Chairman.

Chairman LAMPSON. Well, then, I certainly want to thank the panel, and I thank all of you for coming and appearing before our subcommittee.

Under the Rules of the Committee, the record will be held open for two weeks for Members to submit additional statements and any additional questions that they might have for the witnesses. If we have those, we will mail them to you. And with that, this hearing is adjourned. Thank you.

[Whereupon, at 4:25 p.m., the Subcommittee was adjourned.]

Appendix:

ANSWERS TO POST-HEARING QUESTIONS

ANSWERS TO POST-HEARING QUESTIONS

Responses by Vice Admiral Conrad C. Lautenbacher, Jr., Under Secretary of Commerce for Oceans and Atmosphere; NOAA Administrator, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

Questions submitted by Representative Bob Inglis

Q1a. When the Administration was developing its FY09 budget request, was it assumed that the \$25 million included in the FY08 CJS Appropriations bills in both the House and Senate for climate sensors would pass?

A1a. Since such funds were included in both the House and Senate marks, the Administration thought it was possible at one point, but by the time the Administration concluded development of its 2009 request the 2008 appropriation bill had been finalized without the funding.

Q1b. How was that FY 08 funding to be used?

A1b. If the approximately \$25 million had been provided, it would have been used to support work on restoring CERES and TSIS instruments. It should be noted that NOAA and NASA have identified funding within their FY 2008 resources that will be used to initiate the CERES and TSIS efforts.

Q1c. How has the elimination of this \$25 million from the FY08 Omnibus Appropriations bill affected development of key climate sensors for the NPOESS satellite program?

A1c. As reported previously, the Administration has developed a cost-effective, prioritized package of steps to preserve data continuity for certain key climate measurements that were removed from the NPOESS program during the 2006 restructuring of that effort. Such steps relate to the required sensor analysis and development work to sustain two important climate measurement capabilities: total solar irradiance (measured by the Total Solar Irradiance Sensor, or TSIS) and earth radiation budget data (from the Clouds and Earth Radiant Energy System sensor, or CERES). This initiative is supported by \$74 million in funds contained in the President's FY 2009 Budget request, and it represents the Administration's principal plan for addressing these important measurements in the near-term. As such, the Administration believes that full funding of NOAA's FY 2009 President's Budget request is required to ensure uninterrupted access for these important data.

Within this context, the elimination of the \$25 million in FY 2008 climate sensor funds had the potential to postpone necessary analysis and design efforts and potentially lead to scheduling challenges in terms of adding the sensors to other spacecraft. However, as noted earlier, NOAA and NASA have identified funding within their FY 2008 resources that will be used to initiate the CERES and TSIS efforts in the required time frames.

Q1d. How effective will the \$74 million request for climate sensors in FY09 be in the development of these instruments and maintenance of the launch timeline?

A1d. The President's FY 2009 Budget request for \$74 million will allow NOAA and NASA to continue the necessary work to place the Total Solar Irradiance Sensor (TSIS) and Clouds and Earth Radiant Energy System (CERES) instrument onto available satellites in the timeframe required to prevent data continuity gaps. With this funding, NOAA and NASA will be in a position to address these deadlines and potential data gaps.

Q1e. If this Congress once again fails to make climate sensors a priority in the FY 09 appropriations bill, how can the U.S. best utilize data from international sensors to meet climate change data requirements?

A1e. If the FY 2009 budget request is not funded, the United States will be required to utilize data from international sensors through collaborative partnerships as the data becomes available. However, establishing these partnerships will take time and access to these data is not guaranteed. Moreover, the data are likely to be incomplete and not fully compatible with U.S. models and algorithms, which could result in harmful gaps in the data record.

Furthermore, not funding the request for climate sensors and climate data records in the President's FY 2009 Budget request would require NOAA to cancel any TSIS instrument development in FY 2009 and impair our ability to fly a replacement CERES instrument on the first NPOESS satellite (NPOESS-CI). The cancellation of TSIS development would create a data gap in total solar irradiance measure-

ments (a Global Essential Climate Variable), thus disrupting a data record that is approximately thirty years old.

Q2. The President's budget request includes money to study risk reduction measures for ocean vector winds. If this money is not appropriated, how does NOAA intend to analyze QuikSCAT follow-on options? Is NOAA considering observation methods other than satellites to meet this data requirement?

A2. The President's FY 2009 Budget request includes a \$3 million initiative to continue studies for ocean surface vector winds, including options for addressing this requirement from satellite and non-satellite sources. If the FY 2009 funds are not appropriated, NOAA will be unable to undertake the necessary studies to further refine and analyze mission concepts, including studies to define and reduce the risk of likely options. In the interim, NOAA will continue to use QuikSCAT measurements until the satellite fails. NOAA is also collaborating with our partners in Europe to determine how to best use data from European satellites. We are also talking with India and China about obtaining data from their proposed satellites that will carry similar technologies.

Non-satellite options include but are not limited to the use of buoys, aircraft, and fixed platforms in coastal areas that measure wind vectors near the ocean surface. NOAA will continue to work on improving the number and quality of observations from aircraft and research the use of unmanned aerial systems. With the requested funding, NOAA will study space-based and nonspace-based alternatives to meet the requirement.

Q3. I understand that in FY08, the GOES-R program suffered a \$44 million cut from the original budget request that caused a three- to four-month delay in the launch schedule. If NOAA is not appropriated the President's full budget request for FY09, what will be the impact on the 2015 launch date? How will such a slip affect existing satellite capabilities?

A3. If the FY 2009 Congressional appropriation does not fully fund the President's Budget request, NOAA would carefully assess how to distribute the funding reduction. Potential options include further delays to the launch schedule and a reassessment of the sensor suite. A delay to GOES-R would increase the risk to overall geostationary satellite data continuity for the United States in the event of a failure of one of the nearly completed GOES satellites. GOES-O or GOES-P. Without the imagery from GOES satellites, the Nation's view of severe weather, including hurricanes, would be severely hampered reducing warning lead times for the Nation.

The President's FY 2009 Budget request for the GOES-R program is \$477 million, a \$242.2 million increase over FY 2008 enacted amounts. This request will fund spacecraft and ground system contracts, continue development of the major GOES-R instruments that already are under contract. NOAA and NASA system engineering and integration, and program management. GOES-R is at a critical point in its development process, and full funding of these activities is essential to meet a launch date of no later than April 2015 while actively managing technical, cost, and schedule risk.

Q4. How would a 2009 continuing resolution affect the anticipated GOES-R satellite acquisition?

A4. The impact of a continuing resolution would depend on the particulars as to the funding level provided and its duration. Assuming a full-year continuing resolution at the FY 2008 funding level, NOAA would consider whether to postpone awarding contracts for the spacecraft and ground segments. The contract for the spacecraft is currently expected to be awarded in the first quarter of FY 2009, with the ground segment expected to be awarded in the second quarter of FY 2009. If the program is delayed, significant costs increases would be introduced, as well as increased risk to NOAA's ability to maintain continuity in geostationary satellite coverage.

Q5. In February, the Committee was informed that there was a potentially serious battery problem on the GOES-11 satellite, one of the two primary weather satellites over the U.S. This satellite is supposed to be operational until 2011. Although we have an on-orbit spare, how would the loss of GOES-11 affect the importance of the GOES-R launch timeline? How does this affect the anticipated mission life of the on-orbit spare? Will a new reserve satellite be needed for the out-years?

A5. Engineers at NOAA and NASA have been monitoring the GOES-11 battery issue very carefully and have developed operational procedures to ensure that critical instruments receive the necessary power during the eclipse cycle that is scheduled to end in mid-April.

At this time, NOAA does not believe that the battery issue will adversely affect the planned operational life of GOES-11, nor do we believe that a new reserve satellite in the GOES-N series is required. NOAA believes that the funding in the President's FY 2009 Budget request is adequate to support GOES-R satellite development and launch in sufficient time to ensure uninterrupted satellite data continuity following the GOES-N series.

Q6. What steps has NOAA taken to make sure that the GOES-R program does not repeat the mistakes of the NPOESS satellite program, particularly with regards to delays and cost overruns?

A6. NOAA has thoroughly reviewed and applied lessons learned from the National Polar-orbiting Operational Satellite System (NPOESS) and other space acquisition programs to ensure that the GOES-R Program does not repeat the same mistakes. NOAA has put a number of management and systems engineering processes in place to implement these lessons learned. Specific initiatives taken to keep the GOES-R development effort on schedule and within budget include:

- **Risk Reduction:** The procurement strategy has been structured to address the highest risk areas of the GOES-R program early and to ensure that the technology required for GOES-R is sufficiently mature. NOAA recognized early that the GOES-R instruments are a technical risk area for the program. To address this, NOAA partnered with NASA to leverage its strength: NOAA has placed NASA in charge of acquiring the space segment (spacecraft, instruments, and launch) while NOAA is in charge of the fielding the ground system. In addition, the GOES-R program initiated instrument development efforts prior to committing to full scale system procurement to lower the risk of instrument development issues affecting the larger program's cost and schedule. In addition, the GOES-R program had prototype test models developed for the two most complex instruments (Advanced Baseline Imager and Geostationary Lightning Mapper) to ensure that the technology and manufacturing processes were proven prior to building flight instruments.
- **Management Oversight:** NOAA studied a number of management strategies and commissioned independent reviews to develop the management approaches that best suit the program and NOAA's ability to manage the risk to overall program success. This approach is documented in a GOES-R Management Control Plan (MCP) and patterned off-proven NASA space acquisition processes. In implementing the MCP, NOAA has established a robust program office that uses the expertise and experience of both NOAA and NASA, their support contractors, and the best of each agency's processes to ensure active and in-depth oversight of the development contractors. Key elements of this program office include:
 - 1) Fully integrated NOAA and NASA program personnel located at Goddard Space Flight Center,
 - 2) Significant systems engineering and other technical and programmatic oversight resources to oversee contractor activities,
 - 3) On-site representatives at the prime and subcontractor facilities to increase awareness of program status,
 - 4) NOAA System Program Director that aggressively manages NOAA and NASA Project Managers to ensure key risks and technical challenges are identified and dealt with early, before they create a risk to overall cost, schedule and performance of the program.
- **External Reporting:** The MCP also describes routine reporting by the program to NOAA and NASA management regarding program status. The program has already begun conducting regularly-scheduled contractor technical and program management reviews and presenting program status updates to DOC, NOAA, and NASA leadership at a series of management reviews. NOAA has established a Program Management Council (PMC) to provide oversight to the major acquisition programs, and the GOES-R program is periodically reviewed by the PMC. The GOES-R program is implementing the program control directive contained in the FY 2008 *Omnibus Appropriations Act* and will provide annual program reports and quarterly program status reports to Congress.
- **Realistic Cost Estimating and Budget:** GOES-R has developed a realistic Program Office Estimate (POE) and reconciled this estimate with a separate NOAA Independent Cost Estimate (ICE) effort. An important feature and lesson learned from NPOESS was to use an 80 percent confidence level rather

than a 50 percent confidence level estimate as used in the Department of Defense. This means the budget requests will more likely cover expected costs without requiring additional budget allocations to deal with unforeseen issues.

- **Incentive Structure:** GOES-R intends to pursue a mixed incentive and award fee incentive structure to provide the Government the flexibility to adjust the incentive priorities as the program progresses in response to specific issues that may arise. Applying an important lesson from NPOESS, there is no base fee associated with the GOES-R program. The GOES-R fee structure includes incentives that aim to minimize cost growth while providing incentive to the contractors to meet major program milestones.
- **Independent Reviews:** NOAA has used and will continue to use an independent team of experienced space program experts that will regularly review the GOES-R program to ensure program readiness at key decision points and program execution status on an annual basis.

Q7. *The Administration's FY09 budget request includes doubling of funds for the NOAA Profiler Network, the severe weather detection network in "Tornado Alley." What activities will this increase support? How effective has the Profiler Network been in the forecasting of tornadoes?*

A7. The FY 2009 program increase for the NOAA Profiler Network (NPN) is a planned Procurement, Acquisition and Construction (PAC) investment to (1) convert the existing frequency of the NPN to avoid frequency interference with the European Space Agency GPS Satellites (Galileo), which will cause the loss of data from the NPN and (2) provide a technology refresh to the 20-year-old observing system.

The NPN has been effective in forecasting tornadoes and has, 30 operational wind profilers located in the central U.S. along "tornado alley." Studies have shown the following improvements in tornado detection as a result of wind profiler data:

	WFOs within NPN*	WFO Nat'l. Ave.	WFOs Outside NPN*
Probability of Detection	0.79	0.72	0.62
False Alarm Rate	0.68	0.74	0.85
Lead Time (minutes)	12.9	11.5	9.5

Accuracy Performance Measures for NOAA Weather Forecast Offices (WFOs), 1999 through 2003 (Wolf, 2004).

*Selected Weather Forecast Offices in areas where tornadoes occur often.

Q8. *No funding was appropriated in FY08 for water vapor research and the Administration's budget request includes only \$0.9 million for FY09.*

Q8a. *Was any money requested for water vapor research in FY08?*

A8a. NOAA is committed to enhancing climate research. In the FY 2008 budget request, the Administration requested \$0.9 million to support water vapor process research.

Q8b. *Considering water vapor accounts for most of the greenhouse effect in our atmosphere, is the requested amount of funding for FY09 really sufficient to properly investigate the effect this greenhouse gas may have on the continued warming of our climate?*

A8b. The funding requested in FY 2009 is sufficient to initiate and enhance measurements of water vapor in the lower atmosphere (specifically the upper troposphere and the lower stratosphere between approximately 3 to 15 miles above the surface) to be able to better understand the processes that lead to the current distributions and lay the foundation for future predictions of water vapor distributions. Accurate measurement of water vapor abundances and its distribution in this region are an essential first step in better understanding the role of water vapor in the climate system. NOAA has a diverse mission ranging from managing fisheries to predicting severe weather and providing climate services. The Administration's request provides a balanced set of priorities to sustain core mission services and address our

highest priority program needs. Even within a restrained fiscal environment, the FY 2009 President's Budget Request includes over \$319 million in NOAA for climate-related activities. This is an increase of \$53.3 million over the FY08 enacted level.

Q8c. By contrast, how much money goes toward the research of carbon dioxide effects?

A8c. In FY 2007, NOAA spent approximately \$20 million on carbon dioxide research as part of its climate related activities, and it expects to spend approximately the same amount in FY 2008. This amount includes several activities and projects that are most directly related to carbon dioxide research, such as ocean carbon monitoring, the Global Carbon Cycle program, and climate research done at the Global Monitoring Division of the Earth System Research Laboratory. It is important to note that the study of carbon dioxide effects is a fundamental part of NOAA's climate observations, research and modeling, and there are additional carbon dioxide related activities that are part of a larger project or program where the dollars specifically aligned with only carbon cycle research cannot be as easily quantified.

Q8d. What are the relative concentrations of water vapor and carbon dioxide in our atmosphere?

A8d. By quantity, there is much more water vapor than carbon dioxide in the atmosphere. Water vapor varies from trace amounts in extremely cold and dry air to about four percent in extremely warm and humid air. The average amount of water vapor in the lowest part of the atmosphere averaged for all locations is between two and three percent. In the upper troposphere and the lower stratosphere, the amount of water vapor is much less. Carbon dioxide levels are near 0.04 percent everywhere in the atmosphere. That means there is more than 60 times as much water vapor in the atmosphere than carbon dioxide in average conditions. Both water vapor and Carbon dioxide are greenhouse gases. They both trap outgoing long wave (infrared) radiation between the Earth and the atmosphere. This has an effect of keeping temperatures warmer than they otherwise would be. It should be noted, however, that increased concentrations of water vapor and carbon dioxide alone do not create proportionate increases in warming, as the relative effectiveness of each greenhouse gas is dependent on more than just general concentration in the atmosphere.

Questions submitted by Chairman David Wu and Representative Darlene Hooley

Q1. States, Tribes and local communities are supposed to receive 27 percent of funds from the Tsunami Warning and Education Act (Public Law 109-464) for the National Tsunami Hazard Mitigation Program. Please provide a state-by-state breakdown of all funds that went to these entities for Fiscal Years 2006, 2007, 2008, and Fiscal Year 2009 based on the President's budget request.

A1. The *Tsunami Warning and Education Act* (TWEA; Public Law 109-464) for the National Tsunami Hazard Mitigation Program states that 27 percent of funds appropriated under this program are to go to the National Tsunami Hazard Mitigation program (NTHMP), not necessarily to the states, tribes, and local communities. TWEA defines the components of the NTHMP to include:

- 1) Inundation mapping and models for hazard assessment
- 2) Community outreach and education programs to ensure community readiness
- 3) Tsunami preparedness and mitigation programs
- 4) Promotion of adoption of tsunami warning and mitigation measures
- 5) Periodic external review of the program.

The NTHMP Coordination Committee was formed on April 2, 2008 to conduct the program as specified in Section 5 of P.L. 109-424. The committee is chaired by NOAA's National Weather Service. To fulfill its specific responsibilities identified by law, the Coordination Committee will:

- (1) Recommend how funds appropriated for carrying out the program under [Section 5] will be allocated;
- (2) Include representatives from Federal, State, local and tribal governments;
- (3) Provide recommendations to the National Weather Service on how to improve the TsunamiReady program, particularly on ways to make communities more tsunami resilient through the use of inundation maps and other mitigation practices; and

- (4) Ensure that all components of the program are integrated with ongoing hazard warning and risk management activities, emergency response plans, and mitigation programs in affected areas, including integrating information to assist in tsunami evacuation route planning.

Below is the requested state-by-state breakdown of all NTHMP funding provided to the states for FY 2006 and FY 2007. In FY 2006, NOAA was directed in the conference report for the FY 2006 Appropriation to fund approximately \$500K each for Tsunami sirens for the states of Washington and Oregon. This \$1.0 million addition is not reflected in the chart below. Funding distribution for FY 2008 is planned as indicated below. The FY 2009 President's Budget NTHMP Spend Plan by Agency is still being determined by the NTHMP Partners. In addition to the proposed FY 2008 allocation to the States, as much as \$1.0 million of WARN Act grant funding could be used to support outdoor (Tsunami) alerting technologies for the four Western States (California, Washington, Oregon, and Alaska). These grants (\$250K each) are not reflected in the chart below.

In thousands of dollars			
NTHMP Spend Plan by Agency	2006	2007	2008*
Oregon	\$274.0	\$268.5	\$223.2
Washington	\$274.0	\$268.5	\$225.7
Multi-State TSU Info-Alert	\$36.0	\$34.2	\$50.0
Multi State Education	\$0.0	\$0.0	\$90.0
Hawaii	\$274.0	\$268.5	\$223.2
Alaska	\$274.0	\$268.5	\$223.2
California	\$274.0	\$268.5	\$224.8
USGS - CREST	\$332.0	\$324.2	\$273.7
USGS - Univ of Alaska	\$271.0	\$264.3	\$227.4
Puerto Rico	\$100.0	\$146.5	\$202.1
USVI	\$25.5	\$48.8	\$143.2
Guam	\$0.0	\$24.4	\$0.0
American Samoa	\$0.0	\$24.4	\$0.0
Study on Potential of Gulf Coast Tsunamis -			
Alabama	\$0.0	\$0.0	\$34.0
Northern Marianas Islands	\$0.0	\$0.0	\$37.5
Maryland	\$0.0	\$0.0	\$0.0
M&M Subcommittee	\$0.0	\$0.0	\$25.3
FEMA - Multi-State Engineering Prog.	\$50.0	\$0.0	\$0.0
NOAA	\$49.5	\$30.0	\$27.4
- Trvl for New States to 2 Mtgs	\$0.0	\$20.5	\$29.5
Total	\$2,234.0	\$2,260.0	\$2,260.0

*Note: The final allocation to the NTHMP is \$2,375 (determined after NOAA's FY08 Appropriation was received). The additional distribution of \$115 (\$2,375 - \$2,260) among NTHMP Partners will be determined by the NTHMP no later than April 15, 2008

Q2. NOAA has included programs such as the International Tsunami Information Center, the NESDIS/National Geodetic Data Center and the NOAA PMEL Inundation Mapping and Modeling Program as funding that counts towards the 27 percent funding that is required to go towards the National Tsunami Hazard Mitigation Program. What justification did NOAA use to include these programs? Please provide a justification for each program. What dollar amount from each of these programs goes to states, tribes and local communities that would count as "community based" programs as expressed in Public Law 109-464 Sec. 5(a)?

A2. As indicated in the previous response above NOAA disagrees that States, Tribes, and local communities are supposed to receive 27 percent of funds from the *Tsunami Warning and Education Act* (Public Law 109-464) for the National Tsunami Hazard Mitigation Program (NTHMP). Public Law 109-464 defines the components of the NTHMP to include inundation mapping and models for hazard assess-

ment, community outreach and education programs to ensure community readiness, tsunami preparedness and mitigation programs, promoting the adoption of tsunami warning and mitigation measures, and providing periodic external review of the program.

NOAA believes this is a national program that includes participation with the States. In FY08 NOAA is meeting this 27 percent through the following components. Attached is a spreadsheet that reflects NOAA's FY 2008 allocation for its Tsunami Program as well as the projected FY 2009 Tsunami spend plan based on the FY 2009 President's Budget Request. This updated spend plan was provided to the Oregon Congressional delegation staff on March 5, 2008.

Tsunami Hazard Mitigation Program Components: (27 percent Mandate)

- *State Funding under the NTHMP* (\$2.376 million): Historical program activity with an emphasis on Tsunami Hazard Mitigation (community preparedness and education/outreach) grants to States. Projected FY 2009 spend plan allocation reflects \$3,000K funding supplement from planned Spectrum Auction proceeds to accelerate community-based tsunami mitigation programs.
- *NOAA TsunamiReadyProgram* (\$750.2K): Funds accelerated NOAA effort to expand recognition of at-risk coastal communities as "Tsunami Ready." Of the \$750.2K allocated for NOAA TsunamiReady in FY 2008, the majority (65 percent) will be awarded to the States/local communities to aid them in becoming TsunamiReady. FY 2009 spend plan of \$1,500K funding supplement from projected Spectrum Auction proceeds to accelerate NOAA's Tsunami Ready programs (goal: triple number of NOAA TsunamiReady communities added per year (from 10/year to 30/year).
- *Tsunami Warnings & Earthquake Observations for Alaska (TWEAK)*: Funds (\$321.5K) State of Alaska Tsunami Ready Program Support through a grant to the University of Alaska at Fairbanks.
- *Expand International Tsunami Information Center (ITIC) (Labor: two FTEs)*: Funds two additional FTE's for an expanded ITIC Tsunami outreach and education efforts. The purpose of the ITIC is to provide Tsunami Hazard information to the international community including all member states in the U.S. supported Pacific basin Tsunami Warning system.
- *PTWC-ATWC Salaries: Hazard Mitigation Warning Coordination (two FTEs)*: Funds (\$300.0K) for both NOAA's Tsunami Warning Centers (located in Honolulu, HI and Palmer, AK) which now have approximately 15 FTEs each. Approximately one FTE (\$150K) is spent on supporting NOAA's Tsunami Hazard Mitigation/Community outreach education efforts, with the focus on the State of Hawaii and the four Western U.S. States (Alaska, Washington, Oregon and California).
- *National Environmental Data and Information Service (NESDIS)/National Geophysical Data Center (NGDC)—Data Archive*: Funds (\$275.5K) NOAA's Tsunami Historical data Archive. Key component of NOAA's inundation mapping, modeling, and forecast effort (funds baseline Tsunami and bathymetry data).
- *NOAA/Pacific Marine Environmental Laboratory (PMEL)—Inundation Mapping & Modeling Program* (\$2 million): Accelerates NOAA's National inundation mapping and modeling effort. Direct support the Tsunami Hazard Mitigation Program since Tsunami Hazard assessment is paramount to a successful Hazard Mitigation effort. Initial effort is focused on developing high resolution inundation mapping and forecast models for 75 high risk locations. FY 2009 spend plan reflects an additional \$3,000K funding supplement from projected Spectrum Auction proceeds to accelerate NOAA's inundation mapping and modeling effort to complete 75 (nationwide) forecast models by 2010 versus 2013.
- *NWS Base Funds: Coastal Weather Forecast Office Warning Coordination Meteorologists (WCMs) (TsunamiReady)*: NWS Base funds (Local Warnings and Forecast budget line) of approximately \$521K associated with WCMs at 34 NWS coastal Weather Forecast Offices (WFOs) in support of NOAA's Tsunami program. These WCMs are NOAA's (on the ground) direct focal point with local at risk communities. There primary effort is to educate these communities as to Tsunami Hazard Mitigation Programs (primary focus NOAA's Tsunami Warning Program). The Pacific Region has two coastal WCMs who spend approximately 20 percent of their time on this effort. Alaska Region has three WCMs at 15 percent: Western Region has seven coastal WCMs at

20 percent: Southern Region has 13 coastal WCMs at seven percent: Eastern Region has nine coastal WCMs at five percent.

- *International Tsunami Information Center (ITIC) Base Funds:* Funds provided to the ITIC prior to the December 2004 Indian Ocean event. FY 2008 Base funds total (\$564.1K). Funded Linder the NWS Local Warnings and Forecasts PPA. The purpose of the ITIC is to provide Tsunami Hazard information to the international community including all member states in the U.S. supported Pacific basin Tsunami Warning system.
- *WARN ACT Grants for Outdoor Alerting Technologies:* Up to \$1.0 million of WARN Act grant funding could be used to support outdoor (Tsunami) alerting technologies for the four Western States (California, Washington, Oregon, and Alaska). This funding is only available in FY 2008.